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LAKE CARRIERS' ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interests of Lake Carriers, and to improve the character of the service rendered to the public.

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SEASON'S TRAFFIC ON THE GREAT LAKES.

On the Great Lakes the traffic for October, compared with the same month of last year, according to the Bureau of Statistics, shows a gain in the quantity of flour, coal, iron ore, lumber, logs, and unclassified freight shipped. Shipments of grain for the month in question this year were 19,600,066 bushels, compared with 25,089,341 bushels in October, 1900 For the first ten months of this year the principal receipts in lake traffic all showed a marked increase over the corresponding period of last year, with the exception of grain, which is twenty-four and a half million bushels behind 1900. Part of the gains may be accounted for by more complete statistics, but as a rule nearly every branch of the lake trade has made gains during the season of navigation now drawing to a close, compared with the previous season. It is to be noted that coal shipments from Buffalo have been more than 36 per cent. larger than last season's trade. The shipments of sugar by lake from Buffalo increased from 1,726,053 to 2,099,744 barrels. Shipments of the five leading cereals from Buffalo by canal have been two and two-third million bushels larger than last season, while the shipments by rail have been almost twenty-five million bushels smaller in amount than those of a year ago. At the Sault Ste. Marie canals the total freight movement this season to October 31 was 24,543,610 tons, compared with 23,090,766 tons for the corresponding period last season.

The freight rates prevailing on the four leading commodities—grain, coal, lumber, and iron ore—show a considerable increase over the preceding months. Wheat from Duluth advanced from 2¼ cents per bushel to 3 cents. Coal advanced but little, but the rates that have prevailed all season on ore were broken. The rates in some cases advanced 30 cents per ton. Lumber advanced 25 cents per thousand feet.

The following rates were in effect this month on the four leading commodities—grain, coal, lumber, and ore:

On grain: Wheat, Chicago to lake Erie ports, ¼ to 1⅜ cents per bushel; Duluth to Cleveland, 2½ to 3 cents per bushel; to Buffalo, 2¾ cents per bushel. Corn, Chicago to Buffalo, 1¼ cents per bushel; to Lake Erie ports, 1¼ to 1⅛ cents per bushel. Oats, Chicago to Buffalo, 1 cent per bushel Barley, Duluth to Cleveland, 2¼ cents per bushel; Milwaukee to Buffalo, 1¼ cents per bushel. All grain, Duluth to Lake Ontario, 5 cents per bushel.

On coal the rate form Buffalo to Toledo, Duluth, and Gladstone was 35 cents per ton; to Hancock, Houghton, and Marquette, 40 cents per ton; to Chicago, Milwaukee, Green Bay, Manitowoc, and Waukegan, 60 cents per ton; to Racine, 70 cents per ton; and to Portage, 35 and 40 cents per ton. From Ashtabula to Green Bay, 55 cents per ton, and from Ohio ports to Gladstone, 50 cents per ton.

On lumber, Lake Superior to Chicago and lower lake ports, $2.75 and $3 per thousand feet; Lake Huron to Ohio ports, $2.25 per thousand feet. This is an advance of 25 cents over the old rate. Pine Lake to Cleveland, $2.25 per thousand feet. This is also an advance of 25 cents per thousand feet. Ashland to Muskegon, $3 per thousand feet, and Menominee to Chicago, $1,62½ per thousand feet.

On ore, from Escanaba to Cleveland, 60, 65, and 70 cents per ton; Buffalo, 75 cents per ton; and Lake Erie ports, 70 cents per ton. From Marquette to Cleveland, 75 to 80 cents per ton; from head of lakes to Lake Erie ports, $1 to $1.10 per ton; to Ohio ports from Ashland and Two Harbors, 90 cents per ton; and from Gladstone, 70 cents per ton.

THE NEW SHIP YARD—GRAIN CARRIERS.

The first boat to be turned out by the new shipyard of the Columbia Iron Works, whose plant is now under course of construction at St. Clair, will be a decided novelty in the way of a grain carrier, and the outcome of the experiment will be watched with interest by marine men, especially owners of grain carrying boats on the Great Lakes.

The new feature of the boat is to be a hopper bottom, the first one on the lakes, and it is claimed by the promotors that the hopper feature will greatly aid in the discharge of the cargo at the elevators at Point Edward, opposite Port Huron.

Messrs. Jenks, Botsford and Duncan, who are behind the movement which will eventually mean the construction of about six grain carriers each, of 6,000 tons capacity, are confident the new scheme will be a marked success, and that its adoption in future grain carrying boats will be but a matter of time, or until the new boats have been tried out and given a chance to demonstrate their practicability.

The promoters claim that the new bottom will dispense entirely with the trimmers and steam shovel arrangements now employed to get the grain to the leg, where it is elevated from the hold of the boat into the bins of the elevators.

The new boats will have eleven hatches, with a corresponding number of hoppers directly underneath and extending consecutively from the machinery space and coal bunkers, to the forward water bulkhead.

While the water compartment between the bottom of the cargo hold and skin of the boat will have the same capacity as boats the size of the ones to be built, it will be differently arranged.

When completed, the boats will operate from Duluth to Port Huron with grain for the Grand Trunk railway, and will have passenger accommodations for forty passengers.

LIQUID FUEL.

The Consulting Engineer of the Russian Steam Navigation Co., read an interesting paper recently at a meeting of engineers in Odessa, on the subject of oil fuel for steamers, in which he pointed out that Russia was the pioneer in the use of oil for steam generation at sea. The largest vessels plying in the southern reaches of theVolga have long ago discarded all other fuels in faver of ostatki, or residue; while the vessels of the Eastern Co., on the Caspian Sea, though built with coal-burning furnaces, and using coal alone on their maiden voyage from Great Britain to Aserakan, invariably have their furnaces altered and adapted for the use of oil on their arrival in the Caspian. Some years ago the Russian Steam Navigation Co. determined to give the vile looking "ostatki" a trial on three of their vessels, and the experiment has given most gratifying results. Cost for cost, the experiment has demonstrated in the clearest manner the advantage of oil fuel over coal, the cost of oil per mile amounting to only one-third that of coal. Further, on the score of cleanliness the superiority of oil is abundantly proved, a consideration of great importance in vessels of the passenger class, where cleanliness means increased comfort. Several other advantages were noticeable at the trial, not the least of which, in the eyes of the engineer, was the easy and equable regulation of the heat over the whole heating surface, the comparatively easy manipulation of the fuel itself under steam pressure, and the saving of labor and waste in the stokehold. Experiments in a similar way with ostatki are to be carried out shortly on certain ships of the Russian Navy.

FOG SIGNAL TESTS.

The report of the British Fog Signal Committee on the experiments conducted during the present vear at St. Catherine's Point, Isle of Wight, has just been issued. The committee was appointed in February last "to make trial of the relative merits of certain sound-producing instruments used or intended to be used on the coasts for conveying sound signals in foggy weather."

On a review of the whole of the experiments the committee desire to submit the conclusions at which they have arrived, together with such recommendations as they think may be fairly based on the experiences gained by the investigation.

The result of the investigation of the committee are summarized as follows:

That where a large arc of nagigable water requires to be guarded, the system of distributing sound over it by means of two trumpets, suitably placed, is more effective than that of using one large trumpet only.

That when the arc to be guarded is larger than can be effectively covered bv two trumpets, the mushroom form of trumpet is a satisfactory instrument for the purpose.

That a siren, when rotated by a separate motor, yields better results than when self-driven.

That no advantage commensurate with the additional horse-power necessary accrues from raising the pressure above 25 lbs. on the square inch for working the siren.

That the number of sonorous vibrations per second produced by the rotation of a siren or the vibration of a reed should be in unison with the proper note of the associated trumpet.

That where two notes of different pitch are employed as a single, the difference between them should, if possible be an octave.

That for calm weather a low-pitched note is more suitable than a high-pitched one: but when the wind is opposed to the course of the sound waves and the sea is rough and noisy, a high-pitched note penetrates further than a low-pitched one.

That from causes which cannot be determined at the time or predicted beforehand, areas sometimes exist in which the sounds from the signal stations may be greatly enfeebled or even lost altogether. This effect was during the trials , more frequentlv observed during comparatively calm weather and at no great distance from the signal station.

In these trials the siren has proved to be the most effective sound producer for fog signal purposes throughout the arc to be guarded and under all the conditions of wind and weather experienced. The reed horn, although much inferior in power to the siren, is suitable for guarding positions of secondary importance.

That, having regard to the uncertainty attending the hearing of the most powerful sound signal in all conditions of weather, a fog signal must be regarded as only an auxiliary aid to navigation, which cannot at all times be relied on, and does not justify any neglect to use the lead in all conditions of doubt.

That when navigating in the vicinity of a fog signal in thick weather, the stopping of the ship and reducing the noises of the vessel moving through the water and the local noises on board to a minimum are most essential to enable the sound of a fog signal to be picked up.

During the whole peroid of the trials from May 8 to June 13 no fog was experienced, and on no occasion was it necessary to suspend the trials in order to allow the signal to be sounded for actual service. It has been demonstrated by previous experiments that a foggv condition of the atmosphere favors the passage of sound waves; it may, therefore, be assumed that the effects recorded would in all probability have been more favorably emphasized if fog had been experienced.

WHEN Frank A. Vanderlip resigned as Assistant Secretary of the Treasury, he went abroad with letters to all the ministers of finance in Europe, and spent many months investigating the financial and commercial situation, with particular reference to the inroads which American trade is making on the whole world. There never was a more important subject for this country, and Mr. Vanderlip, through his training as a journalist and as an officer of our Government, is exactly fitted to write upon it with judgment, and to make it entertaining. The first of his articles on the "American Invasion" of Europe, will appear in the January Scribner's.

CLEVELAND.

Special Correspondence to The Marine Record.

The steamer Andaste has gone into winter quarters at this port.

The steamers John J. Albright and the Maricopa will lay up here for the winter.

The steamer Minnetonka, built at and hailing from Cleveland, is registered at 5,270 gross and 3,860 net tons.

The first meeting of the season of the Marine Engineers' Beneficial Association will be held at the lodge rooms on Water street Saturday evening. Members of other lodges are invited to attend the meeting if in port.

The night crew at the office of the Great Lakes Towing Co. has been laid off for the season. Parties wanting tugs at night will have to make arrangements in advance.

The quarterly meeting of the board of directors of the American Ship Building Co. was held on Wednesday afernoon. It was reported at its conclusion that no action of importance was taken other than the declaration of the usual dividend upon the preferred stock.

The tug Stedman was sent to Huron Wednesday forenoon to break ice and release the tug Avery, which is stuck. When this is done the tugs will come here. The Avery will receive some light repairs, and lay up for the winter. The Stedman will not lay up for some time yet. The schooner Isaac Gerlach was sent to Lorain Wednesday with machinery for the new steamer Frank W. Hart, which was launched last Saturday.

The steamer W. L. Wetmore, which was at one time owned by the late Thomas Axworthy and which for many years hailed from this port, has been added to the list of total losses for the season of 1901. The Wetmore was built by Quayle in this city and came out in 1871. She had a gross measurement of 819 tons. Capt. George L. De Wolf, local inspector of steamboats, sailed the Wetmore for a number of seasons.

The following meteorological observations are furnished by the office of the United States Weather Bureau, Cleveland, for the week ending December 18: Prevailing wind directions for the week, southwest; highest velocity, 48 miles from the southeast on the 13th; mean temperature for the week, 24; highest temperature, 65 on the 13th; lowest, 3 below zero on the 20th. Sunrise and sunset data computed for local time: December 20 sun rises, 7:25; sets, 4:31; December 23 sun rises, 7:26; sets, 4:33; December 26 sun rises, 7:28; sets, 4:35.

The strike of the tug firemen petered out this week. The firemen went out to compel the Great Lakes Towing Co. to replace the second lineman on the tugs Goulder, Kennedy, and Sprankle. The other tugs still in service, the Lutz and the Frank W., have the required two firemen upon them. The committee appointed by the Tug Firemen's Protective Association called upon Local Manager Brogan, of the tug trust, and made their demands. The answer was terse. Mr. Brogan said if he were not allowed to make such disposition of his tugs as he desired and select the service upon them the boats would be sent to winter quarters, whereupon he at once gave orders that the three boats be laid up.

Dan C. Kingman, major of engineers in charge of the work of the Cleveland district, has been collecting data of late concerning the swinging of bridges in the various ports that are similarly situated to Cleveland. It is his intention to consult the rules of other ports and also those of Cleveland and then prepare a new set of rules which he will present to the conference to be held here during the winter by the railroad men and the vessel interests. His rules will be the text for the discussion. Such modifications as are suggested unanimously by the railroads, the vessel men and the city will be made. When the rules have all been made Major Kingman will submit them to the interested parties, together with a call for a meeting.

Since the report has been current that that those on the inside are predicting large increases in the amount of ore to be shipped down the lakes next year it has been coupled with the statement that the dock space, at the lower lake ports, is to be vastly increased during the winter. It was generally believed that such increases were essential. A statement is made, however, which seems to offset this report. It is now learned that the United States Steel Corporation does not contemplate the erection of any more docks, nor will it extend its present facilities. The corporation officers do not believe that it is dock space or dock facilities which are needed to give the boats better dispatch at the lower lake ports, but say that what is necessary is more motive power on the railroads and more cars in which to take the ore away from the docks to the furnaces.

CHICAGO.

Special Correspondence to The Marine Record.

The marine postoffice at Detroit closed for the season Saturday night as the number of boats running after that time did not warrant a continuation of the service.

The first steamer building for the United States Transportation Co. at South Chicago will be named after A. G. Brower, of Utica, N. Y., who is a stockholder in the company. She will be launched early next month. Capt. W. W. Brown, Cleveland, will manage the fleet.

It is reported that L. Dempsey, of the Manistee Lumber Co., and Capt. John Stufflebeam have been negotiating for the purchase of the steamer Francis E. Spinner, which suffered stranding damage and has been lying idle at Manitowoc upwards of a year. The steamer is probably wanted for the salt carrying trade.

The folowing meteorological observations are furnished by the office of the United States Weather Bureau, Chicago, for the week ending, noon, December 18, 1901: Prevailing wind directions for the week, northwest; highest velocity, 48 miles from the south on the 13th; mean temperature for the week, 12 degrees; highest temperature, 49 on the 13th; lowest, 12 degrees on the 15th.

Francis H. Clergue says no plans have been made for the establishment of a ship yard at Sault Ste. Marie, nor has the visit of Sir Christopher Furness had any connection with the steel plant or the tube works at Sault Ste. Marie. The visit of the distinguished gentleman to Sault Ste. Marie was only an incident in a comprehensive tour of the industrial centers of the United States and Canada. The opportunities afforded at the Sault for ship building were discussed at the time of his visit, but no plans whatever were adopted.

The revenue cutter Morrill went out of commission this week and the crew was paid off. Sixteen members of the crew, including Capt. A. B. Davis and Chief Engineer Owen, will remain on the craft during the winter and attend to necessary repairs. Lieut. Haake has been ordered to report at Mobile, Ala. It is thought the Morrill will continue to commission in this district until the latter part of next season, when she wil be replaced by the cutter now under construction.

The Canada Atlantic Line is negotiating for the purchase of the steamers William L. Brown and Kearsarge, both of which have been under charter to the line the past season. The Brown was built at South Chicago last winter, and is owned by a syndicate headed by Capt. C. W. Elphicke, of Chicago. As soon as she was ready for service in June she was chartered by the Canada Atlantic and ran between Duluth and Parry Sound. She is 450 feet long and is a large carrier. The Kearsarge is owned by Pickands, Mather & Co., of Cleveland, and has been in service four or five years.

The South Pier Coal Co., which started as an independent company for the fueling of lake steamers last spring, has closed its docks for the season, and begun the installation of additional derricks, lighters, and new coal chutes to increase its capacity next year. By the installation of the chutes the ordinary lake steamers carrying a fuel supply of 100 tons can coal in fifteen or twenty minutes. The annual election of officers of the company will be held in January, when a full report of the season's business, which has been quite successful, will be made. Capt. George Tebo has been manager of the company since its inauguration.

The Goodrich Line has inaugurated its regular winter schedule, which will be maintained by the steamers Iowa, Atlanta and City of Racine. The last trip of the season to Green Bay ports will be made to-night by the steamer Iowa, which leaves for Menominee and Marinette. The steamer Georgia made her last trip of the season last night to Manitowoc, and will go into winter quarters there to-day. The winter schedule includes a daily trip to Milwaukee at 8 p. m., to Manitowoc every night except Friday and Saturday, to Kewaunee and Algomah on Thursday and Saturday, and to Sturgeon Bay on Saturday.

Four steamers—the Maytham, Brazil, Abyssinia and R. R. Rhodes, were chartered on Wednesday to load and hold wheat till the opening of navigation at a 3-cent per bushel rate. The steamers carry an aggregate of 430,000 bushels, and their chareter, in addition to the regular clause, including transportation to Lake Erie at the opening of navigation, also includes the additional privilege of unloading the wheat into the City Dock or Dickinson elevators at anv time during the winter if desired. The boats secured their cargoes at various other elevators along the Chicago river, including both branches and the main stream. Much of the grain came from the Galena and the Armour Minnesota elevator on Goose Island.

When navigation opened last April vessel owners were confronted with the billion dollar steel trust. Instead of having a number of corporations with which to make contracts for carrying iron ore they had, to a large extent, one. That one possessed 112 ships of its own. Until late in the season, freight rates on iron ore ran along on a level plane. The steel trust stood ready to accept all ships at the prices it had named. There was a steadiness in the market never before experienced. Vesselmen were given assurances that the big trust did not intend to run them out of business, and so confident did this feeling become that the shipyards became overrun with orders for new tonnage.

The ship carpenters and calkers employed in the shops of the Bates Co. on the South branch, went out on strike Monday and the yards employed in handling and repairing wooden vessels are now suffering from a strike of their skilled workmen. The contention is for an eight-hour day at the same rates as are paid at Buffalo for nine hours, and at Milwaukee and Manitowoc for ten hours. The ship yard proprietors here claim that they are in direct competition with the other yards, and that it is impossible for them to pay the full schedule and retain the business for the vessel owners whose vessels come to them for repairs and alterations. The ship yard owners are holding out for the same scale as at Buffalo, which is $2.75 for a nine-hour day, or they will pay $2.50 for a day of eight hours in the winter season, but desire a nine-hour during the season of navigation, when it is important that a boat that is in dry-dock be got out again as promptly as possible.

DULUTH-SUPERIOR.

Special Correspondence to The Marine Record:

Ore shipments for the season just closed from the Lake Superior district by lake, were 20,149,669 tons, showing a gain of 1,579,359 tons over 1900, when 18,570,310 tons were moved. The movement after November 1 was very heavy, and almost half of the gain for the season was made after that date. The increase was 723,738 tons, and only 140,743 tons were sent forward in December.

Vessels under charter for winter storage grain at Duluth are the Yosemite, 185,000 bushels; Pretoria, 160,000 bushels; Matanzas, 160,000 bushels; Howard L. Shaw, 255,000 bushels; I. W. Nicholas, 145,000 bushels and Rappahannock, 120,000 bushels. All of the grain will be wheat with the exception of that of the Shaw and Nicholas, whose cargoes will be flax. The total of bushels is 1,015,000.

The Rensselaer, the last boat scheduled to arrive here this season, came in on Wednesday morning from Marquette, but was delayed. The boat is carrying coal, part of her cargo having been unloaded at Marquette. With the arrival of this vessel the season of inter-lake navigation here ended. The Singer boats, however, intend to run as long as ice does not block their path. The last boats to leave here were the Norwalk and the Sacramento, which cleared early last week.

The following is a list of boats which were lost on Lake Superior: Passenger steamer Bon Voyage, May 10, 500 tons; burned off canal; loss, $13,000. Tug Fern, June 28, 48 tons; loss $5,000. Steamer Eliza Strong, August 31, 781 tons; loss, $32,000. Steamer Hudson, September 16, 2,294 tons; loss, $1650,000. Steamer Fedora, September 21, 1,848 tons; loss, $85,000. Steamer M. M. Drake, October 2, 1,100 tons; loss, $35,000. Schooner Michigan, October 2, 1,056 tons; loss, $19,000.

Fifty-three ore and grain carriers will winter at Superior and Duluth as follows: E. B. Bartlett, Corona, Bell, Holley, J. J. Hill, Manda, Maia, Madeira, Samuel Mather, Whitworth, Superior City, A. D. Thompson, J. B. Colgate, Corsica, W. H. Gilbert, Harvard, Samuel F. B. Morse, Sir Henry Cort, John Smeaton, Cornell, Charles R. Van Hise, Mataafa, Rensselaer, Manola, Princeton, Maunaloa, George Stephenson, Robert Fulton, F. B. Wells, George W. Peavey, Yosemite, 105, 109, 111, 116, 141, 132, Venezuela, Rappahannock, Cartagena, Pretoria, Matanzas, Grampian, Crete, I. W. Nicholas, Hesper, Howard L. Shaw, Algeria, Northern Wave, Northern Light, Northern King, Northern Queen.,

The United States Steel Corporation has just adopted a civil service reform system for the 2,000 employes on its lake steamers, which is destined to have a far-reaching effect in preventing labor troubles in the future. Every man employed on ships will be entered on the lists, and a careful record of his work will be kept. Promotions will be solely on merit as indicated in his record. Every boat is to have its place and positions will be from one to the other with wages to correspond. This civil service system has been a pet project with General Manager A. B. Wolvin, who came up from the deck of a lake steamer. Capt. Wolvin has vigorously resisted the claims of the union that all men are equal and should receive the same pay. He now aims to obtain recognition for superior merit and faithful service on the part of his employes by the new system.

PORT HURON.

Special Correspondence to The Marine Record.

The following boats have gone into winter quarters in Belle river: Steamers—W. H. Sawyer, Ida, Faustin, Tempest No. 1, Tempest No. 2, Wonder, Thomas R. Scott, D. F. Rose, John J. Hill, Abercorn, M. Sicken, George King. Barges—C. E. Redfern, Kate Darley, A. C. Tuxbury, St. Joseph, Uranus, Montpelier, A. J. McBrier, Albany, E. L. Coyne, Lyman Casey, F. M. Knapp, E. J. McVea, James L. Ketchum, Homer, Peshtigo, Delaware, B. W. Jenness, C. J. Fillmore, Checotah, Nelson Brown, Zapotec, Troy.

At this port we have the steamers Mohansett, Armenia, Gould, J. C. Ford, Pawnee, Maggie Duncan, City of New York, Harlem, Castle Rhodes, Monarch, United Empire, Lincoln, Havana, Sparta, Newaygo, Mary Groh, Manistique, A. A. Carpenter, Orion, Rhoda Stewart, Lily Smith, City of Concord, Arbonant, Tom Scott, Leland, Stimson, Sanilac. Barges—Jane Ralston, Bissel, Grover Favorite, Constitution, Racine, Biwabik, Muskoka, Mosher, Lizzie Law, Wm. Edwards, Minnie Orton, Anderson, Young, Roberts, Hannaford, Yankee, Bahama, Howland, Armenian, Robinson. Mary Pierce, Wm. Grandy, Geo. Ward. Schooners—Fulton, Belle Hanscomb, Wawanosh, Sephie, Charles Crawford, Azov, Hattie Wells, Sligo, Queen of the Lakes,. Tugs—George Brockway, L. D. Smith, Jas. T. Martin, F. J. Haynes, C. L. Boynton, Argyle, James Adams, Tempest, Protector, Salvor, Boscobel, Sarnia.

BUFFALO.

Special Correspondence to The Marine Record.

It is said that Capt. Jas. Corrigan has secured an option on the steel steamers Yosemite and Colonel. The terms of the option are not definitely known.

There are a large number of boats here holding winter cargoes, among which are the Aurania, Mars, Senator, Junius, A. A. Parker, Neptune, Jupiter.

At an informal meeting of a number of steamer captains in Buffalo, a few days ago, it was decided to take action upon the wages and other questions the coming winter. A strong organization is to be formed somewhat after that of the M. E. B. A.

Capt. Hinslea master of the steamer Chisholm, who was operated upon for appendicitis in the same week with Capt. Alex. Walters, had sufficiently recovered to be able to visit his boat, which is laid up here, yesterday, and last night departed for his home in Cleveland.

The following craft are in winter quarters at Ogdensburg: Steamers Gov. Smith, F. H. Prince, W. A. Haskell, Walter L. Frost, H. R. James, John Rugee, Hecla, Omaha, Nipigon, Pueblo, Byron Whitaker and Avon; the tugs and barges of the Hall and Hannan fleets, and two schooners, the Abbie L. Andrews and L. S. Hammond.

Capt. A. B. Wolvin, of Duluth, President of the Lake Carriers' Association and representative on the lakes of the steel trust, is quoted as having said: "What Buffalo wants is more harbor, more room in her harbor. I believe the business interests of Buffalo are coming to appreciate the fact more than they have done in the past.

The new steamer being built by Mr. John Devney, of Ashtabula, for the fish and game commission is 80 feet over all, 17½ feet beam, 8½ feet moulded depth. Her cabins will be finished in quarter sawed oak throughout. She will have accommodations for eight passengers besides the crew's quarters. The engines are to be put in by the McKinnon Iron Works.

We regret to announce the death, by apoplexy, of Mr. Frank Bowen, of Mackinac City, on Sunday last. The deceased had been chief engineer of passenger steamers for twenty-five years and was well and favorably known. At the time of his death he was engineer on the Iroquois. His brother left with the remains for his home on Monday last. He leaves a wife and grown up daughter, in comfortable circumstances.

W. J. Connors, who deposited $50,000 with the harbor commissioners of Montreal as a guarantee that he would carry out a contract he made with them to build an elevator for the harbor, will get back $47,000. The amount has been in dispute for many months, and finally the commissioners took some action. The deposit earned $3,000 while in the hands of the commissioners and the amount retained by them is therefore $6,000, which is kept back to pay the cost of all expenses connected with the failure to carry out the contract.

The steel steam yacht, Waller is at the shipyard of Bateman, McDougall & Palmer receiving extensive repairs and alterations. She is having her shafting overhauled, some new plating on bottom and her sides are being raised so as to make her a flush decked vessel. A new electric light plant is being installed together with fresh water tanks to fit her for service on lakes and ocean. This fine vessel is owned by Mr. Menzies, of the Menzies Manufacturing Co., of Toronto, and will be in commission in June, 1902.

Two steamers were passing in the Detroit river, the chief engineer of the down-bound boat was on deck conversing with a lady passenger, when the engineer of the other boat called to him through a megaphone: "Hello Scab!" The lady reported the circumstances of the insult to the management, and the offender was censured for his ungentlemanly conduct and warned not to do so in the future. A more undignified and entirely juvenile propensity would hardly be imagined. For an engineer to descend from his status as an officer and a gentleman, to that of the street Arab, and be guilty of calling names—why, it is almost unthinkable. If these things must be, perhaps it is better that the distance is so great as to call in the use of a megaphone, it is certainly safer (for the caller of opprobious epithets), and the peace and dignity of the United States is not so liable to be violated as if the caller and the called were at close quarters. The fellow who called the other names at long range because he did not think as the other did, has only been chief engineer a short time but is agitating action by the fraternity for deposing the captain and only having two pilots on the forward end of a boat who will be under the direction of the engineer, and subject to his orders as to the running of the boat in fair weather, and stopping in foul. He says, among other things, that the engineers of all boats like he is in should receive at least $3,000.00 per year; the pilots should get about $100.00 per month. Be that as it may, it is certainly safe to say that he, with his boyish tricks, will not be placed in command of any steamer with a valuation of a quarter of a million dollars. Perhaps this winter his Pa will buy him a tin steamer for a quarter, he can command that to his heart's content, and possibly be let break it open so he can see the wheels go round.

The steamer Mark Hopkins lies six miles west of Long Point on the Canadian side, about twenty-five miles from Buffalo, in the most treacherous sands that the lakes afford. It is confessed that never did but one vessel get off that shore when well landed there. That was the F. & P. M. No. 2, which went on there a number of years ago. At the same time the steamer Newburg was lost there, and so quickly and completely was she swallowed up by the sands that most of her cargo went out of sight with her. The sands shift so easily and fill up after a dredge so fast that it is found to be impossible to open a channel from deep water to the Hopkins, for the sand flows in like water. The shore line is said to change as much as 300 feet in a single day of rough weather.

The following named boats are yet to be unloaded here: Edenborn, Elphicke, Albright, No. 129, Poe, S. G. Thomas, Plankinton, Bunsen, Bessemer, Mauch Chunk, Kenebeck, Russia, Maryland, Penobscot, Owego, Neilson, Maricopa, Gates, C. Tower, Jr.; Queen City, John Owen, D. M. Whitney, Holden, Palmer, Gratwick, Heffelfinger Mariposa, Fitzgerald, Starrucca, Walter Scranton, Wade, Iroquois, Bielman, Oliver, Scranton, Coralia, Leimeus, Nimick, Colonel, Hutchinson, Bulgaria, Nyanza, Malitea, Orinoco, Sacramento, Ionia, Parks Foster.

DETROIT.

Special Correspondence to The Marine Record.

While the Bay City custom house is almost next to useless now for the purpose of giving clearances to out-bound boats, it is a very important one for the government, as thousands of dollars are paid over the desk in the way of duties on lumber, lath and shingles. The receipts from this source in 1901 amounted to $123,254.

During the Detroit marine postal season of 1901, which closed Saturday night, there were delivered 400,000 pieces of mail, and money orders to the amount of $10,547.94 were issued. The vessel passages numbered 20,527. Although the season was twenty days shorter than that of 1900, there was a considerable increase in business.

Work has started this week in fitting up the third and fourth floors of the building at the northeast corner of Woodward and Jefferson Avenues, as new quarters for the local lodge of the Shipmaster's Association. "We are making great preparations for the annual ball, which is to be held on January 15," said Capt. McKay. "The Lake Carriers' Association will be in session here then. We are sending out 2,000 invitations, and we expect this ball to surpass those given in previous years."

We have now in winter quarters here the George Stone, Gladstone, John B. Ketcham, Oneida, Emerald, Companion, Senator, Monitor, City of Erie, Livingstone, Clint, Eastern States, Paliki, Pennsylvania, Monguagon, Balize, Mystic Star, A. L. Hopkins, City of Buffalo, Idlewild, Stafford, Ed McWilliams, Newell Hubbard, Charles Chambers, Tashmoo, Greyhound, Ogemaw, Wilcox, City of Alpena, City of Mackinac, Simon Langell, Aranac, Bay City, Saginaw, Mike Corry, Manitou, Oak Leaf, John Oades, State of Ohio, State of New York, Buell, Jesse Farwell, Maria Martin, Norwalk, Moonlight, Westford, E. A. Fulton, Koal Kabin, Search, William Case, Seattle, Hurlbut, Hackett, Forest City, William McGregor, Hayward, Bessie, Homer Warren, Ida Keith, Starkey, Newsboy, Wyandotte, Hattie, Barkalow, Mary, George Sturges, Tillie May, Richard Martini, W. H. Rounds, Embury, Champion Snook, City of Detroit, City of Cleveland, City of Toledo, Favorite, Reliable and Frank E. Kirby.

It has been learned that the plans for the big ship building plant, to be located at the Canadian "Soo" by English capital, headed by Sir Christopher Furness, are now prepared and the site chosen. The plans call for the largest plant on the Great Lakes, of a size sufficient to allow the building of four lake carriers of the largest type at the same time. Furness, during his visit here in October, was enthusiastic over the "Soo" as a site for a ship building plant, and secured complete statistics of lake commerce, and all available facts relating to the ship building industry. The Canadian plant is to located west of and in close proximity to the Clergue Steel Works, the first portion of which is now nearing completion. Of the sixteen tube works mills, for which $25,000,000 has been raised, and in which Furness and Clergue are both interested, fourteen are to be built at the Michigan "Soo" and two in the Canadian "Soo." In connection with the tube works at the American "Soo" big batteries of coke ovens will be built.

Despite all the hard work that has been done the proposed merging of the dredging companies into a trust promises to fall flat. It is now said here to be an absolute certainty that the scheme will not go through, and the reason assigned is that if the trust was formed and an attempt made to raise the price for dredging contracts the government, which is the largest patron of the companies, would refuse to deal with the trust, and would build its own dredges. In fact, the government has already built one large dredge, and more are to be constructed. The dredge owners realize that if they attempt to jump the price on the government they will be simply cutting their own throats, and in a very short time would have a fine lot of dredges on their hands and no work for them. A prominent Chicago marine man who is on the inside as to the dredging combine is quoted as having said: "The dredge combine is practically dead and buried, as the owners and promoters now realize that it can never be consummated. The sticking point came when it became known that the United States Government was considering the feasibility of building a number of dredges of its own, and it was at once seen by the dredgemen that if they took any steps to form a trust or raise prices it would simply settle the question, and the government dredges would promptly be built."

DETROIT.

Special Correspondence to The Marine Record:

The following meteorological observations are furnished by the office of the United States Weather Bureau, Detroit, for the week ending, December 17th. Prevailing wind directions for the week, northwest; highest velocity, 37 south on the 15th; mean temperature for the week, 23 degrees; highest temperature, 54 degrees on the 13th; lowest, 1 degree on the 16th.

At his yard in Bay City, Capt. James Davidson has enough repair work to keep a large force busy throughout the winter and until late in the spring. Among the vessels upon which work amounting to partial reconstruction will be done are the steamers Majestic and Robert Holland; barge Goshawk, tug Samson and two barges. Topside work is to be done on the Majestic, and the Goshawk, in addition to repairs, will be given steel arches.

The following vessels are in winter quarters at Port Huron and Sarnia: Steamers—Monohansett, Armenia, E. F. Gould, J. C. Ford, Pawnee, M. Duncan, New York, Harlem, Castle Rhodes, Monarch, United Empire, Havana, Sparta, Newaygo, M. Groh, Manistique, Carpenter, Orion, R. Stewart, Lily Smith, Argonaut, Thomas Scott, City of Concord, Sanilac, Stimson, Leland, Lincoln. Barges—Ralston, Racine, Bissel, Grover, Favorite, Constitution, Muskoka, Lizzie Law, Mosher, Edwards, Young, Roberts, Yankee, Bahama, Howe, Armenian, Robinson, M. Perew, Biwabik, Hannaford, Wand. Schooners—Fulton, Belle Hanscomb, Wawanosh, Sephie. Theo Voges, Charles Crawford, Hattie Wells, Sligo, Queen of the Lakes, Cavalier, Cataract, St. Clair.

EASTERN FREIGHT REPORT

Messrs. Funch, Edye & Co. report the following condition of the eastern freight market:

There has been a little more activity in chartering for cotton both from the Gulf and South Atlantic ports, but as the demand is confined to vessels in a position to make this month's shipment and the supply of such steamers is quite limited, the volume of business in consequence is not so great as otherwise it might have been. For later loading shippers are not so anxious to make commitments, preferring to go ahead slowly in view of the unfavorable report of the cotton crop.

In all other branches the situation continues most unsatisfactory, there being an entire lack of orders for grain, coal and general cargo. Coal shippers are still handicapped by their inability to secure railroad transportation from the interior to the seaboard, and being severely taxed to fill their regular contracts for bunker coal. Orders for full cargoes are entirely ignored.

We cannot add much to our previous remarks in regard to sail tonnage, which remains scarce. Orders, however, come in otherwise very sparingly, so that very little business has been accomplished.

Possibly the only item of interest is the initial shipment of a cargo of case oil by the Standard Oil Co. to Port Natal at 26c. We understand that the same company are contemplating to assume the trade to the River Plate and to Brazil.

Liverpool grain 2½ cents and a half better to London or Glasgow.

RACING SLOOPS PLATED WITH BRONZE.

The new racing sloop for Mr. H. F. Lippitt, N. Y. Y. C., from designs by Messrs. Gardner & Cox, of this city, will be novel in the respect that the hull will be plated with bronze, after the manner of the cup defenders built by the Herreshoffs.

The new sloop will be of the 60-rater class, and not as before announced, and will have a water-line length of 57 feet. The designers have given the contract for Mr. Lippitt's sloop to George Lawley & Son, South Boston. She will be finished in time for next season's racing.

Another racer of the same class has been designed by the same firm for Mr. George Mallory Pynchon, N. Y. Y. C., and the order for her construction has been placed with the Townsend & Downey Shipbuilding Co., of Shooters' Island. The yacht is also to be plated with bronze. The designers and owners believe these boats will be fast, as they will be thoroughly up to date in every respect.

The bronze used in the construction of these yachts will be the well known "Tobin Bronze" manufactured by the Ansonia Brass & Copper Co., of New York.

THE MANUFACTURERS' ADVERTISING BUREAU have enlarged their office at 126 Liberty Street, New York City, to keep pace with the growth of their business. This company was established in 1877 and is well-known throughout the country. Mr. Benjamin R. Western, the proprietor, was one of the pioneers in what might be called the Trade Journal Advertising Agency business. Mr. Western is recognized as authority in this field.

Vessel Overtaken.—Rule as to Course and Speed.—Where at the time an overtaking vessel signaled her intention to pass the vessel ahead, the latter had stopped her engines to permit a schooner to cross her bows, which purpose was obvious to the overtaking vessel, the resumption of her former course and speed after the temporary purpose of her stopping has been accomplished, can hardly be charged as a violation of the rule requiring her to keep her course and speed. The Mesaba, 111 Fed. Rep. (U. S.) 215.

ARE STEAM ENGINEERS REQUIRED?

It may be a surprise to some readers to find out that this question has never been asked seriously, in reference to manufacturing plants where steam is used as the motive power, but it has been presented on several occasions and some business men claim that all an engineer has to do is to grease the machinery, keep water in the boilers and maintain fires that will generate the required amount of steam.

Furthermore, some of them claim that "any fool can do this," therefore it is foolish to say that an intelligent man is required to run a steam plant.

It is unnecessary to say that we do not support this view of the case, but it may be interesting, and we hope it will also be profitable for steam users to carefully read our reasons for this idea, which teaches that the steam engineer of the present time is an important factor in the development and continuation of our industries.

It may be well in the early part of this article to note some of the differences between an engineer and a fireman.

In many cases they are practically inseparable, as one man acts in the capacity of both alternately, as he must do his own firing and care for his engine and other machinery.

Some firms wish to have their so-called engineer do all the manual labor, and have all the brain work done in the office. The result is almost invariably unsatisfactory to both parties, because the man in the office will do the pleasant and agreeable parts of the business, and leave the disagreeable and unpleasant parts to the man who shovels the coal and oils the machinery.

The result is that the latter performs this part of the work with as little trouble as possible, as he has no special interest in it, and there is no good reason why he should have, under such conditions. Taking, for illustration, the case of a plant having four boilers and two engines, requiring an engineer and a fireman, our ideas concerning the duties of the latter, are that he should have charge of the boiler room in a certain measure, under the engineer, as a matter of course, but he should be made to feel that he has some responsibility in the matter, so far as doing his firing in the most economical way is concerned, also to see that there is always enough water to make the boilers safe from the effects of overheating, and to have enough pride in the place to keep the brass work bright and the floor clean.

The duties of the engineer consist in having general charge of the boiler room, but he should not be obliged to spend his time attending to details there. The engines should receive his constant attention, not only to know that they are running quietly and are free from hot boxes, but he should indicate them frequently in order to know that the valves are properly set, and that no accident, either known or unsuspected has happened that can affect the use of steam in the cylinders. If the engines are loaded to their full capacity, he has no choice in the matter, but must carry the highest pressure under which his boilers are safe, in order to do the work, but if the load is light he should carry a pressure on the boilers that will develop power in the cylinder at the most economical rate.

The power developed under stated conditions should be determined, say once a month, and if the load is increased without any apparent cause, an investigation should be made in order to determine the cause of it. When the engines become worn so that they leak steam or are in danger of serious break-downs, the engineer should order all necessary repairs and see that they are properly executed.

The superintendent is undoubtedly the man to attend to this for other departments, but we insist that this is a part of the engineer's duties to make repairs on his engines, and for this there are two very good reasons. There are scores of superintendents who are very efficient in their regular duties, and really earn large salaries for their employers, who are utterly unfit, both by nature and education, to make repairs on a steam engine.

When a superintendent attempts to interfere with this work it is just as much a case of the usurption of powers, as it would be if the smallest stockholder in the institution should come in and attempt to give orders to the help without consulting the superintendent, and we are certain that such an attempt would result in a row in short order

When supplies are required, such as packing, oil and waste, the engineer is the man to order them, as no one else is as well qualified as he, to determine which will render the best service in their respective places.

As an illustration of the bad effects of another man ordering these supplies, we might cite the case of a superintendent buying cylinder oil that the engineer did not approve of, and this was continued until it was impossible to maintain a steady speed in the shop, because the cheap (?) and inferior cylinder oil had failed to lubricate the valves, which were operated by a shaft governor, and also had so clogged them with sediment that it required much force to move them. The expense of bringing a man from the shop to repair the damage would have paid for many gallons of good oil.

In other cases unsuitable packing is bought by the superintendent in spite of protests from engineers, and used until rods are scored and ruined, and much unnecessary friction is created thereby, not only between parts of the engines, but between the engineer and his employer. If the boilers or the engines are not working right, the engineer should decide what is necessary to do, and see that it is done, as this is certainly a part of his duties, and when the work is done he should have the credit if it works well, or take the blame if it is not satisfactory, provided his ideas are fully and carefuly carried out.

The superintendent of a mill or factory has many chances to reduce the cost of production and make other improvements that will bring him in favor, (and keep him there) with his employers, but the engineer has only one plan for this purpose, which is to improve the operation of his plant, and he should be allowed the privilege without restraint. In some cases proprietors and superintendents claim that no responsibility is placed on their engineers, as they are only required to run the machinery, as they are told to, which is the whole of their duties, but when something goes wrong the blame is put on the engineer in a large majority of cases, and if an improvement is made somebody else gets the credit for it.

If a boiler or a steam pipe fails and kills one or more persons, and investigation shows that the engineer was carrying an unsafe pressure at the time, he is blamed for it by the general public, although it may be proven that it was done by direct orders of the superintendent or owner. Therefore the only safe plan for the engineer to adopt is to resign, rather do anything that will endanger his own life, or the lives of others, and take good care to let it be known what caused him to resign.

One of the most important duties of an engineer is to keep his boilers clean, and in order to do this it is quite evident that he must empty them when they need it, according to his own best judgment, but we find cases where orders are issued from the office concerning the time when boilers shall be cleaned, when the man who issues these orders knows nothing about the condition of them, and is strongly influenced by the fact that if they are emptied it will cost something for water to fill them again, and to raise steam from the cold water.

There is at least one care that an up-to-date engineer constantly has on his mind, and that is the ever present danger of some small accident that will cause his engine to race, and thus result in serious trouble. After an engineer has once seen and heard his engine begin to race, and by quick decision and rapid movements has succeeded in stopping it before the fly wheel bursts, he never forgets it, therefore he is always watching for a repetition of the trouble, and constantly ready to shut down, even if there is danger of the fly wheel going to pieces. It will be noted that nearly all throttle valves are in a line with the fly wheels they control, so that the engineer must go where the danger is greatest, and several lives have been lost in this way.

The danger from this source is greater now than ever before in the history of steam enginering, because cast iron fly wheels are run much nearer their bursting speed than ever before, hence the margin between every day practice, and the danger limit is less than when slower speeds were rather the exception.

One of the worst things that an engineer has to contend with is a pound in his engine that he cannot locate. It sometimes proves very difficult to do this, as the noise is telephoned from one part to another of the machine, until it appears to be in several places alternately or in two places at once. The worry caused by such a condition of affairs is worse than all the work a man does, under favorable conditions. We have known more than one case where an engineer was about ready to give up his job in order to secure freedom from a noisy engine, and the consequent worry and labor caused by it. As a rule, however, they persevere until the trouble is located and a remedy applied.

The foregoing facts and many more that might be mentioned, go to prove that engineers are required, and that the business calls for reliable men in order to do the work properly, and command the respect of their employers.

The plants that are kept in the best repair, run at the best advantage and give the best satisfaction, are those in full charge of competent engineers who are with them constantly, therefore know just what they require.

Superintendents sometimes say that they are obliged to care for engines and boilers, as their engineers are not competent to do it. In some places they have never tried them to see whether they can do it or not, and no man should be condemned without a trial.

If they really are incompetent, they should either be educated to properly perform the duties of the position they hold or else be relieved from duty and better men put in their places.—The Tradesman.

THE following is a list of the countries that have adopted, to a certain extent, the water tube boiler: Great Britain, India, United States, Germany, Denmark, France, Italy, Japan, Spain, Russia, Austria, China, Argentina, Brazil and Egypt, making a total of 259 ships, and a total collective horse-power of 1,070.440. This includes some of the largest and most powerful battleships and cruisers in existence.

In memory of T. H. Ismay, founder of the White Star Line, the White Star Line Steamship Co., Liverpool, England, has endowed the charities of Liverpool and Belfast to the extent of £20,000 ($100,000) in memory of the late Thomas Henry Ismay, founder of the line, who died November 23, 1899. The company has also commissioned Mr. Hubert Herkomer to paint two portraits of Mr. Ismay, one for the widow and the other for the company.

USE OF VARIOUS VAPORS IN MARINE ENGINES.

The author considers from a thermodynamical point of view, the use of vapors other than steam as the motive power of marine engines. Among other advantages claimed for the use of petroluem vapor, it is stated that the heating value of the fuel is used to greater effect, owing to the fact that the formation of petroluem vapors requires a considerably smaller quantity of heat than is the case with steam. The author indicates the fallacy of such reasoning, and shows that if the original temperature of the liquids be 20 degs. C., the amount of heat necessary for the production of a cubic metre of steam at 6 atmospheres pressure is 2,082 calories, whilst in the case of petroleum ordinarily used, which is composed of the hydro-carbons C7 H16 and C8 H18, and has a mean molecular weight of 108, 2,460 calories are required; for alcohol the corresponding number of calories is 2,390. The real advantages offered by the employment of such vapors, which make them eminently fitted for the engines of pleasure boats, are cleanliness of working, the use for heating purposes of part of the vapor produced in the boiler, and, finally, the high conducting power of the liquids and the consequent possibility of using small boilers.

Great efficiency would be obtained by making use of a liquid of low molecular weight and relatively low heat vaporization. Such a liquid presents itself in liquefied ammonia, but its use in an engine working with a condenser would be impracticable.

Petroleum and similar liquids also find application in lifeboats, in submarine boats, both to propel them when at the surface, and to charge the accumulators for the dynamos used to drive the boat when under water; in sailing yachts, for auxiliary motors, and for other such purposes.

The author considers also those cases in which the steam, after coming from the cylinder, is employed to evaporate a second liquid, the vapor of which is also made use of for driving the engine. When either is taken as this second liquid, the author shows that the theoretical amount of work obtainable from a given quantity of steam may be increased by 10.7 per cent. without any increase in the amount of heat consumed, the losses unavoidable in practice would alter this number but slightly.

Ether vapor owes its especial value as a means of converting heat into work to a peculiar property, the possession of which is indicated by theory and confirmed by practice—namely, that when it expands and does work, heat must be withdrawn from it in order that it may remain saturated; from this it follows that if the amount of heat passing through the walls of the cylinder be kept within certain limits, no deposition of liquid occurs in the cylinder, a great advantage over steam being thus obtained. Further, for the same yield of work, the temperature of working, and hence also the loss of heat is lower for ether than for water. These considerations explain the success obtained some years ago by Mr. De Susini, who passed steam at 2.5 atmospheres pressure into a surface condenser, the tubes of which were filled with ether. The ether vapor thus obtained, having an initial pressure of ten atmospheres, was used to drive an engine with specially-constructed stuffing boxes, etc., after which it was condensed and returned to the tubes of the surface condenser. Direct heating of an ether boiler would be attended with danger owing to the great difficulty of regulating the heating.—Inst. C.E.: Foreign Abstracts.

MARINE PATENTS.

687,241. Motor for propelling Boats. John F. Kerns, Buffalo, N. Y.

687,325. Screw-propeller. James B. Macduff, Brooklyn, N. Y.

687,638. Ventilating Apparatus for Life-boats. James Main, Liverpool, England.

687,910. Construcion of vessels. John S. Watters, New Orleans, La.

687,933. Means for Operating Bulkhead Doors. Carl T. Dorr, Ohligs, Germany.

688,920. Apparatus for Unloading Coal. Alexander E. Brown, Cleveland, Ohio, assignor to Brown Hoisting Machinery Co., a corporation of Delaware.

688,338. Hydraulic Dredging Apparatus. Elton Risley, Pleasantville, N. J.

688,360. Rope Clamp. James B. Stone, Worcester, Mass.

688,398. Means for Altering the Trim of Marine Craft. William A. Dodge, Fall River, Mass.

688,607. Vessel Sounding Rod. William H. Dixon, Chicago, Ill.

688,643. Self-feathering Paddlewheel. David W. Horton, Petersburg, Ind.

688,672. Marine Vessel. William Niemeyer, St. Joseph, Mo.

688,692. Means for Propelling Ships. Richard Richards, Midway, Kan.

688,758. Port Light for Marine Craft. Robert J. Victor, Arlington, N. J.

Design, 35,435. Propeller Edward E. Strothman, West Superior, Wis. Term of Patent, 14 years.

There are now in ships of war, 560,000 h.p. of Niclausse boilers in 53 vessels, the French possessing 24 so fitted; the United States, six; Britain, four; Russia, four; Germany, two; Japan, three; Italy, three; Spain, three, etc. These boilers are built by the Stirling Co., Chicago

A CANADIAN OPPORTUNITY.

"But I am constrained," writes one of the foreign ambassadors at Washington, "to appeal to you, and through you to His Excellency, the President, to place a check upon these limitations, which are being added to solemn treaties by opinions and mere treasury orders."—Foreign Relations, (1901) p 193.

Was the distinction just which the diplomat made between "opinions" and "mere" commands of the Treasury posing as "opinions"? What weight is to be given to "Treasury Decisions" by complainants and courts? How are foreign governments entitled to treat citizens of the United States when the latter are aggrieved by deprivation of their property through some autocratic, *ex parte*, "mere order" of some branch of the foreign government? For the New Testament rule is international law: "With what measure ye mete, it shall be measured to you again." (Matt. vii, 2).

In a letter to the Secretary of the Treasury, Nov. 27, 1901, the Comptroller of the Treasury thus describes the decisions of his own office: "Mr. A. desires to know whether this office, before rendering the decision in his case, notified him of the grounds on which it was proposed to disallow his claim," (this is not a correct statement of A's desire) "so as to afford him an opportunity of presenting arguments against such grounds, and whether the records of this office show that he was or was not notified. In regard to this matter I have to say that it is not the practice to give claimants such advance notice, and there is nothing in the record of Mr. A's case to show that such a notice was given him."

Just what this means, or may be held to mean by courts and foreign officials, is to be gathered from its basis, the "decision" referred to. It was by the Democratic predecessor of the present comptroller. As long as that opinion stands, not vacated as void, it may be cited for a very different purpose than that intended by its maker.

Its date is June 26, 1897. The June weather of Washington is hot; Comptroller Bowler is recorded in the newspapers of that time as impatient to be rid of his expiring official duties, and to flee over the cool ocean to Europe. Perhaps that was one reason why he paid no attention to a series of written requests, which lay before him in said June, 1897. They were by an appellant from an auditor's decision affirming the withholding of naval pay on the ground that the court martial "sentence" which imposed the tax, was legal. Extracts from these requests are furnished in a letter of the auditor, Nov. 1, 1901:

On April 27, 1897, the claimant, A., wrote the comptroller that as "the burden of proof rested on the United States to show that every statute governing and restricting the court-martial's procedure was compiled with" (122 U. S. 555), he "need do no more than make claim. But, to expedite matters" he proposed to "point out the 'fatal defects' when the case is ready for hearing."

Waiting, expecting a hearing, he received no reply. So on May 8, he reminded the Comptroller, "I request that you signify your readiness to entertain my request for pay."

That told Mr. Bowler that the request of A was not in the paper before Mr. Bowler. No reply coming, on May 10, A. asked to see whatever "statement, pleading or evidence" was made in supposed rebuttal of his case "before decree is pronounced upon it." In short, A. proposed to pay respect to the Comptroller's decisions as involving pleading and evidence, or their agreed upon equivalent.

The Comptroller apparently being dead or asleep, on May 13, 1897, came this waking up, a reminder of what had gone before: "Having thus challenged the validity of the court-martial, the burden of proof, as in cases of libel, is upon the Navy Department, the possessor of any evidence to the contrary. (11 Pick. 445; 122 U. S. 556) I respectfully object to anything like an *ex parte* trial, which all hearings hitherto have consisted in, namely, in receiving some plausible assertions of the Navy Department, keeping me in ignorance of them, and rendering a decision against me."

The Treasury dockets show that no replies to any of these requests were made. The last one, dated May 21, 1897, read:

"Again I ask that no *ex parte* decision be made, that whatever objections, (if any appear to exist to my claim) be notified me before they are allowed to deny it. So far all decisions have been *ex parte*, ignorant and superficial, owing to the fact that a real trial has been refused, and justice denied by arbitary or partly foolish officials."

In quoting the foregoing the Auditor for the Navy Department adds: "There are no papers on file in the case from the Navy Department to the Comptroller, nor anything to indicate that the claimant was notified and heard by the Comptroller before the decision was made in his case." (Letter dated November 1, 1901, "No. G. H. F. 1998.")

He was not notified. This is proved by the contents of his quick, indignant response to Mr. Bowler's "opinion" of June 26. This response, on file in the Comptroller's office, reads:

"Your ruling in my case just been received. In my letter to you of May 21, 1897, now on file in the Treasury Department, as having been received May 22, 1897) occurs this *qualification of my appeal* to you: 'Again I ask that no *ex parte* decision be made,, that whatever objections, if any appear to exist to my claim, be notified me before they are allowed to deny it.

"I respectfully ask why that request was not complied with? Why was I given no notice of the objections recited in your opinion and a hearing thereon?

"Was it through oversight or because the regulations of the Treasury Department do not permit it? If the latter, please refer me to the book containing such.

"None of the papers submitted to you touch upon the 'Blake case' at all, because, by reason of a certain statute and certain decisions of the Supreme Court, and of the Attorney-General not brought to your attention, the Blake case does not control my case at all. Neither does the case of Johnson vs. Sayre, 158 U. S. 111—as might have been shown had I been notified," (N. Y. Maritime Register, p. 9, of Nov. 20, 1901) "of any reasoning on the other side."

On the same day, June 28, Mr. Bowler replied, not denying these statements, but claiming that "a full and careful consideration" could be given by a judge of a case in which he refused to hear the complainant, and betrayed the motive of his indifference to argument and evidence by admitting that his decision was a foregone conclusion "in view of the action of the Navy Department."

On June 30, A. replied to this with his final letter to Mr. Bowler:

"Your communication, dated the 28th of June, does not answer the question I asked of you. In presenting my case to yon I particularly and repeatedly said that it was but a partial presentation, that I did not negative every possible objection, that I did not attempt to prove a negative, and that I wanted no decree to be made, and authorized none, until I was given an opportunity to answer supposed objections, if any. I am not asking for a rehearing. I simply ask why was not this very natural and reasonable request complied with? Not denying your opinion as to the fullness of the consideration given my case, I respectfully ask a specific answer as to specific facts, You did not object to my request of May 21, 1897, before your final decision was rendered. You allowed me to suppose that it would be compiled with. The presentation of my case was extremely incomplete, therefore. Why then was I not notified of at least your belief in regard to the Blake case? Not a trace of my discussion of this appears in all my papers." (See letter from Comptroller to Secretary of the Treasury, Nov. 27, 1901.)

No reply was made to this. None could have been made which flattered the then Comptroller. Speaking of such a decision the Supreme Court held (Hovey vs. Elliott 167 U. S. 413): "The fundamental conception of a court of justice is condemnation only after hearing. To say that courts have inherent power to render decrees without any hearing is to convert the court into an instrument of wrong and oppression" Quoting Windsor vs. McVeigh, 93 U. S. 274, "a sentence pronounced against a party without hearing him, or giving him an opportunity to be heard, is not a judicial determination of his rights, and is not entitled to respect in any other tribunal." the court added (167 U. S. 415); "This language but expresses the most elementary conception of the judicial function. At common law no one was condemned without being afforded opportunity to be heard. (418) Proceedings cannot be valid unless they proceed upon inquiry and render judgment only after trial."

The present Comptroller, whose decisions are of a high order, would probably say that his rule of practice applied only to those cases where no hearing is asked. Not only was hearing asked here, but Mr. Bowler was explictly told that the appeal to him was not to be understood as fully made or as made at all, until completed after notice of the allegations, etc., by the defense. "The substance and not the shadow," continues the court in 167 U. S. 445, "determines the validity of the exercise of power. Looking at the substance and not the form, the judgment was substantially one without a hearing, for of what efficiency or avail was the summons to appear when the court rendered its judgment upon the theory that the defendant had no right to be heard in his own defense?"

Such a "rule of practice" is void, and such a decision as that of Mr. Bowler's is also void, and ought to be held void by the Treasury, as not a fair sample of its decisions. For the Supreme Court has denounced it as "not entitled to respect."

GEORGE F. ORMSBY.

MANHEIM INSURANCE COMPANY.

From the accounts of the Mannheim Insurance Co., of Mannheim, for the year ending June 30th, it appears that the gross premium income of the company for marine, river, and inland insurance for the past twelve months amounted to £415,234 (against £368,303 in the previous year), the reserve from last year's account for risks not run off and outstanding claims to £89,060, and the balance of interest amount to £9,454, making, with £951 the balance from last year's account, a total of £514,700. From this sum £162,869 was expended in reinsurance premiums, £161,896 in net loses, £34,451 in agency commission and costs, £8,875 in expenses of management, and £134,848 was placed to reserve for risks run off and outstanding claims, leaving a net profit of £11,708 against £11,010 a year ago. This sum has been distributed as follows: £8,000 in paving dividends of 8 per cent.; £863 bonus to directors, £750 gratuities to the clerks, and £745 gratuity fund for the clerks, £1,350 being carried forward.—Fairplay.

SHIPPING AND MARINE JUDICIAL DECISIONS.

(COLLABORATED SPECIALLY FOR THE MARINE RECORD.)

Salvage.—Care of Property by Salvors.—Salvors are responsible for the reasonable care of the property which they have in charge, both as respects damage to the property itself, and the infliction of damage on other property. The Bremen, 111 Fed. Rep. (U. S.) 228.

Responsibility of Overtaking Vessel.—An overtaking vessel takes whatever risks attend her attempt to pass, from whatever cause arising, except from the fault of the vessel ahead, which is bound only to keep her course and speed. The Mesaba, 111 Fed. Reb. (U. S.) 215.

False Claims—Forfeiture of Award.—Where an officer of a vesesl makes false claims as to the extent of salvage services rendered, and supports the same by his testimony, he will be excluded from any share in the award made for such services. The Bremen, 111 Fed. Rep. (U. S.) 209.

Action Against Master for Assault—Evidence Considered.—Evidence considered, and held insufficient to sustain a libel filed against the master of a steamer by the steward, to recover damages for personal injuries alleged to have resulted from an unprovoked assault made upon him by the master. Dorrell vs. Schwerman, 111 Fed. Rep. (S. S.) 228.

Awards for Services Rendered to Burning Ships. The salvage services rendered by various tugs to the burning steamships Bremen and Main, which took fire from the burning of their dock in Hoboken, in rescuing seamen, towing the ships to where they could be beached, and in putting out the fire, considered, and awards made therefor. The Bremen, 111 Fed. Rep. (U. S.) 228.

Admiralty Jurisdiction—Maritime Contracts—Employment to Procure Charter.—A contract to obtain a charter for a vessel is not maritime, and a court of admiralty has no jurisdiction of an action thereon to recover commissions, although a clause providing for the payment of such commissions is embodied in the charter party. Taylor et. al. vs. Weir, 110 Fed. Rep. (U. S.) 1105.

Maritime Liens—Repairs and Supplies—Home Ports.—A lien does not attach to a vessel for repairs and necessaries furnished in a port of the same state as her home port, which can be enforced in a court of admiralty, unless such lien is given by a state statute, and the requirements of such statute have been complied with. The John S. Parsons, 110 Fed. Rep. (U. S.) 994.

Shipping.—Loss of Cargo.—Unseaworthiness of Barge.—A barge held unseaworthy, from the manner of her construction, for a voyage between St. Michael and Nome, Alaska, in October, and her owner for that reason not entitled to exemption, under section 3 of the Harter act, from liability for the loss of cargo taken on board for such a voyage. Parsons et al vs. Empire Transp. Co., 111 Fed. Rep. (U. S.) 202.

Admiralty Jurisdiction—Enforcing Remedy Given by State Statute.—Although a court of Admiralty has jurisdiction of an action to enforce a remedy for a tort ,given by a state statute, where such tort was of a maritime nature, and commited on navigable waters, it can give no relief except in conformity with the statute creating the right of action. Stern vs. La Compagnie Generale Transatlantique, 110 Fed. Rep. (U. S.) 996.

Compensation—Character of Services.—Where tugs made no effort to take a burning ship from her slip when the dock was on fire, but passed her by and went to the aid of another vessel which at that time did not need their services, and gave her assistance only after she had been brought out by others, while entitled to compensation, their services were not of a high order of merit. The Bremen, 111 Fed. Rep. (U. S.) 228.

Purchase of Vessel—Verbal Recognition of Liens.—Promises made by the purchaser of a vessel to pay claims for repairs and supplies furnished such vessel before his purchase, and statements recognizing liens therefor, will not bind either him or the vessel where they were made upon representations by the claimants that they had valid liens, and in the belief that such representations were true, when in fact no such lines existed. The John S. Parsons, 110 Fed. Rep. (U. S.) 994.

THE Marconi sysem of wireless telegraphy has been stalled at a number of points in the Gulf of St. Lawrence by the Dominion Government. The work was done by the steamer Tyrian, D. J. Keeley, superintendent in charge, representative of the Marconi Co., on board. The lines will be operated by the Dominion Government, for the benefit of shipping and now extend eastwardly along the north shore from Baie des Moutons to Chateau Bay, on the Labrador shore of the Strait of Belle Isle, a distance of 247 miles, and a cable has been laid connecting Chateau Bay with Belle Isle.

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PEACE AND A POWERFUL NAVY.

We are building up a powerful navy for the express purpose of preserving the peace, and every battleship and cruiser that hoists her flag in commission is a pledge that the peace will be kept. In the past few years we have made wonderful advancement in possessions, in commerce, and in wealth; and great as have been the additions to our naval strength, they have been trivial in comparison to the enlargement of the national interests, which the navy is called upon to defend.

In all sincerity we proclaim ourselves to be a peace-loving people, and in adding ship to ship we believe we are making more remote that day when the ambitions of other nations might have led them to violate those clearly-stated and easily-understood principles by which we wish to regulate our conduct as one of the great nations of the world. In an earlier age, to possess the implements of war was to make haste to use them; to-day the nations that maintain the greatest armaments appear to be the most reluctant to set them in motion. It is certain that so long as our naval strength is adequate to our necessities, war will never be thrust upon us.

As a journal devoted to the peaceful arts, we present this delineation and description of our growth as a naval power, in the firm belief that the first and last duty of our navy, the fundamental object of its existence, is to place the nation in a position of defense so secure and unassailable that we may pursue the arts of peace without fear of molestation, or even the shadow of affront.

The spirit which at once begets and controls our determination to have a navy commensurate with our national standing was admirably defined in a recent utterance of the Secretary of State: "There will be no more surrender of our rights than there will be violation of the rights of others. No wantonness of strength will ever induce us to drive a hard bargain with another nation because it is weak, nor will any fear of ignoble criticism tempt us to insult or defy a great power because it is strong."—Scientific American.

LAUNCH OF THE FRANK W. HART.

The steel steamer Frank W. Hart was launched successfully last Saturday from the Lorain yards of the American Ship Building Co. Miss Mildred Hart, of Cleveland, had the distinction of christening the boat which was built to the order of J. C. Gilchrist & Co.

RESOLUTIONS ADOPTED.

Several important resolutions pertaining to the betterment of the conditions of the fresh and salt water seamen were brought up and adopted at the meeting last week of the International Seamen's Union of America, in convention at Buffalo. One deals with the exclusion of the Chinese from this country. Frank Johnson, a delegate to the convention from San Francisco, introduced the resolution.

Oscar Allen, of Boston, Mass., introduced a resolution favoring the amendment of the treaties act which is now in vogue between the United States and other nations. Mr. Allen now claims that through this act a seaman practically becomes the property of the vessel upon which he is engaged. This resolution will be sent to the President and the Senate of the United States with the request that the act be amended. Mr. Allen's resolution is as follows:

"Whereas treaties entered into between the United States and other nations, give to those nations and vice versa, the right to cause the arrest, detention and reclamation of seamen who have simply violated a civil contract to labor on board ship; and

"Whereas such stipulations treat the seamen as the property of the vessel upon which he is engaged; and

"Whereas such provisions are alike dishonorable to the seamen, and unnecessary for the carrying on of commerce and utterly repugnant to modern times of liberty; therefore, be it

"Resolved by the International Seamen's Union of America in convention assembled that the President and the Senate of the United States are hereby petitioned to cause these conventions to be so amended as to restore to the seaman the ownership of his body and thus give to him the full right to quit any merchant vessel on which the service has become obnoxious to him, in any safe port in which such vessel may be at the time."

COMPRESSED AIR AS A SAFE POWER.

Considerable attention has been called recently to compressed air explosions, so much in fact, that an impression might be given that compressed air is an unsafe power. On the contrary, it is the safest power or means of transmitting power that is in use at the present time. When we consider the great number and variety of uses to which compressed air has been applied in its comparatively short period of development, it is to be expected that some failures would occur, but it is only through ignorance of the cause of these explosions and carelessness on the part of engineers that these troubles do exist.

Compressed air installations are used with pressure up to 3,000 lbs. to the square inch, not only in any mine of any magnitude, in all tunnel work, quarries, ship building, submarine work and for refrigerating purposes, but it has a very wide range of usefulness in all manufacturing lines. Nearly every machine, erecting, boiler shop and foundry of any size has its own compressor plant, and from all of these varied sources comparatively few accidents have been reported. As a means of safety many of the powder magazines throughout the country are using compressed air as a motive power, to the exclusion of steam and electricity.

The reason why compressed air is a safe power is the fact that it has no reserve force, as in the case of steam boiler explosions, where the destructive effect is caused chiefly from this force, that is, the sudden conversion of large volumes of superheated water into steam, by the reduction of pressure above the water space in the boiler. In the case of air, when a vent occurs, it serves to reduce the strains. This is due not only to the expansion of the air from a smaller space into a larger one, but a rapid reduction in volume, due to the fall of temperature in expanding. The failures that have occurred in the use of compressed air can, in nearly every instance, be traced back to the ignition of oil or some inflammable substance which is used with the air. Low-test lubricating oil, for example, fed to the air cylinders, may meet with a temperature greater than that of its flashing point. In putting oil into the cylinders, any surplus that may reach the cylinders is forced out through the delivery valves into the air pipes and receivers. The products of decomposition of a large quantity of oil in the receiver would, with the air, form an explosive mixture.

Air in itself is a perfectly safe fluid, and only requires a vessel strong enough to hold it. In this respect the problem is not a serious one, as the factor of safety in the case of air may be less than for steam, water or gas, as it does not corrode the vessel, its temperature is not changed, and it causes no internal destruction.

It will thus be seen that air is the cleanest, healthiest and, except through the course of compression, is as nearly absolutely safe as any power of this kind can be.—American Engineer.

SUBMARINE BOATS FOR ENGLAND.

In spite of the contempt with which the idea of submarine boats was received in the first place by the British Admiralty, they do not at last intend to be behind other naval powers in the possession of such boats, whether they eventually prove efficient in warfare or otherwise. The first of a number contracted for at Barrow has been launched some time ago, the balance of the contract being held up until the performance of the first of the class was thoroughly tested and perfected if necessary. Apparently, the tests, which have so far been conducted in secrecy, have been satisfactory, as we understand that the balance of the contract is shortly to be finished, and that the Admiralty are about to include a further number of these submarines in their Naval Estimates for the coming year. Although such submarine and secretive form of warfare is quite repugnant to the temperament of the tar, who dearly loves hard knocks broadside, still, as a matter of policy, it is, perhaps, well that we should not allow any possible antagonist to imagine that they are better provided with a novel form of weapon than ourselves. So much is heard now, too, of the approaching improvements in electrical science, which enable self-propelling torpedoes to be controlled and directed as to their course by wireless electrical communication from a very considerable distance, that it would appear as if a submarine boat or weapon of offense, which must carry precious lives within it for proper guidance and direction, is becoming already out of date. When a torpedo can be started on its diabolical errand, and can be directed from a distance without wire attachments to either right or left, so that it can scarcely fail to reach its object, it is difficult to see what further terrors a submarine boat can have for its helpless victim. The probability of such a perfect control of a travelling torpedo is now within measurable distance when so much has been done with wireless telegraphy. A sensitive receiver upon the steering gaer of the torpedo may well be arranged to operate the rudder to either right or left at will, and the result is thus accomplished.—The Marine Engineer, London.

NOTES.

A CONTRACT has been let for the erection at Sault Ste. Marie of the plant of the Union Carbide Co., by the Mason & Hodge Co., of Frankfort, Ky. The plant will take 20,000 horse-power from Clergue's water-power reservoir.

IT is reported that fifteen foremen of the Edgar Thompson Steel Works, in Braddock, Pa., have been taken into partnership with the Carnegie Co., $150,000 worth of stock being distributed among them. Heretofore it was only the heads of departments who received bonuses like this.—American Machinist.

ARTHUR SEWALL & Co., Bath, Me., will, it is stated, in the early spring build an addition to their steel ship building plant by the construction of a large machine shop. In the past the Sewalls have built only sailing vessels, but it is understood that in the near future they may be so equipped as to be capable of producing steam craft as well.

IN order to expedite the manufacture of armor plate needed for the battleships now building, the government has asked the Bethlehem Steel Co. to increase its armor-producing capacity, and the directors of the company have authorized the enlargement of the plant. The increase asked for is to 500 tons daily, the present output being 300.

THE H. W. JOHNS MANUFACTURING CO., of New York, and the Manville Covering Co., of Milwaukee, each company having been closely identified as handling the goods manufactured by the other, have consolidated their interests. This consolidation is to take effect January 1. The new company, whose capital stock will be $3,000,000, will be known as the H. W. Johns-Manville Co. The officers of the new company will be: Mr. T. F. Manville, president; Mr. C. B. Manville, vice president; Mr. George W. Gladwin, vice president; Mr. F. R. Boocock, tresurer, and Mr. H. E. Manville, secretary. Mr. James G. Cannon will be chairman of the board of directors. Mr. C. R. Manville will be manager of the western department, and he, with Mr. C. B. Manville, will remain in Milwaukee. Mr. T. F. Manville and Mr. H. E. Manville will remove to New York. The new company is rapidly completing a plant at Milwaukee for the manufacture of carbonate of magnesia and mineral wool. When this plant is completed, the company will be prepared to furnish a most complete line of all grades of steam pipe and boiler coverings and asbestos goods of all descriptions.

IRON ORE MINING IN MINNESOTA.

The iron ore mines of Minnesota, so far as they are developed, are situated in St. Louis County, about midway between Lake Superior and the boundary line of Ontario. They are located in two ranges, which are about twenty miles apart and extend in an easterly and westerly direction; the more southern of the two is the Missabe, the other the Vermillion Range. The ore deposits do not stretch in an uninterrupted body across the country, they are scattered along in groups, at irregular intervals; long stretches of non-merchantable ore being sparsely interspersed with groups of rich mines. On the Vermillion Range two groups of mines are now in operation; one at Ely and the other near Tower, on the east shore of Lake Vermillion. The mines on the Messabe Range are centered around the towns of Biwabik, McKinley, Sparta, Eveleth, Virginia, Mountain Iron and Hibbing. A number of new mines are being developed near Sharon and Buhl. All mines on the Vermillion Range are underground, ranging in depth from five hundred to one thousand feet. There is no mine over two hundred and fifty feet in depth on the Messabe Range, but quite a number are surface or daylight workings. The way in which the ore from such mines is extracted differs materially from the old practice of mining underground deposits; two systems are in use, milling and steam shovel work. The latter is conducted on the same plan as the work in an ordinary gravel pit, with the exception that first the overlaying gravel and sand is stripped off the ore body. The ore is shaken loose by powder blasts, and loaded by steam shovels into railroad ore cars. In order that this system of work shall be economical, there must be no delays. The milling system is resorted to in all mines where the ore body lies at no great depth from the surface, and where, for various reasons, steam shovel work is not advisable.

The essential features of the milling system are, first the removal of the overlaying ground and the sinking of hoisting shafts in the side walls to the bottom of the ore deposit. Drifts and cross-cuts are made from the shafts through the ore body, and numerous raises are cut to the surface. The raises are timbered and provided on the lower end with proper appliances for loading the ore into tram cars. The ore on the surface is loosened by blasting and falls down the raises. At the bottom it is drawn out and conveyed to the shafts, where it is hoisted to the surface. This system of mining is very economical and requires very little timbering, aside from that of the drifts, cross-cuts and raises.

All the ore from the Vermillion Range, and much from the Missabe Range, goes to the docks at Two Harbors; the remainder is taken to West Duluth, or to Allouez Bay, near West Superior. The year 1900 was marked by its great activity in iron ore production. The year's shipments from all Lake Superior mines amounted to 19,059,393 long tons, and the Minnesota mines contributed a little less than 50 per cent. of this amount. The ore docks mentioned above received and loaded, during the season, 9,465,355 tons of ore; 7,809,535 tons came from the Missabe, and 1,055,820 tons from the Vermillion Range. Last year's production showed an increase of 1,067,469 tons over that of the preceding year. Three railroads divide the transportation of the ore from the mines to the docks, and the figures best give an idea of the heaviness of the traffic. One mine of the Missabe Range loaded and shipped last year 14,000 tons of ore in one day; that is to say, within twenty-four consecutive hours. Four steam shovels were at work scooping the ore from the stock piles into the rialroad cars. Five hundred and sixty cars of twenty-five tons capacity and eleven locomotives were required to move that quantity. An ore train generally is made up of one locomotive, fifty-one ore cars and one caboose, and all the cars and locomotives coupled together would have made a train two and one-half miles long. Since last year, however, ore cars of thirty-five and fifty tons capacity have come into use. The total amount of last year's production, loaded in cars of twenty-five tons capacity, would have required 378,614 cars, and 7,424 locomotives to move them. They would have made a train 1,816 miles long. Bearing in mind that lake navigation generally lasts but eight months of the year, and that with the close of navigation all ore movements by rail come to an end, it will not be surprising to learn that ore trains have precedence over any other train on the road.

The great bulk of the men employed in the mines, seven to eight thousand, are foreigners. Mr. John Pengilly, general manager of the Chandler mine at Ely, says in a description furnished to the Geological and Natural History Survey of Minnesota, 1896-1898: There are not more than 10 per cent. of our men who speak the English language, and not more than the above number who have the remotest idea of mining." Nearly 40 per cent. of all so-called miners are Finlanders; another 40 per cent. are Austro-Hungrans; Italians form about 8 per cent. of the whole, and the rest are American, German, Scotch, Swedish, Canadian, Welsh.

Each of the two principal classes present distinct features of interest to the student of political economy. The Finlander, as a rule, is a strong, well-built person, all muscle and bone, and from childhood used to hard work and meagre fare. Reared under adverse circumstances, and under an unsympathetic government, he came to this country buoyed by the hope of bettering his condition, and to enjoy the free exercise of political rights. It is his ambition to become a citizen, and one of his first acts, as soon as an opportunity is presented, is to declare his intention of naturalizing. According to the moral influence of his surroundings, the character of the Finlander as a citizen will be determined. We find the best proof of this in relative conditions of the second oldest mining town of both ranges—the town of Ely, on the Vermillion Range.

The Chandler mine was opened in 1888, and the Pioneer started up the following year. Prior to this Ely was practically unknown. To-day there are five mines in operation around Ely, giving employment to about 1,300 men. The town has a population of about 3,700 inhabitants, which includes nearly 90 per cent. of the mine employes. There are no company dwelling houses, boarding places, or stores, and the employes, when not on duty, are free from restraint by the company.

Of the total number of mine workers at Ely, 40 per cent., or about 520 persons, are Finlanders. A Finnish national temperance society of 350 members is maintained principally by mine employes. They have a fine steam-heated hall, lighted by electricity, and with a seating capacity of 500 people Weekly meeting and occasional entertainments are held, and the society, in addition to its efforts to elevate and improve its members, maintains a sick and death benefit feature. Mr. Pengilly, who has been living at Ely since the opening of the first mine, says that the beneficial effect of this society upon its members cannot be overestimated; that its influence has helped to reduce the number of accidents, incidental to the hazardous occupation of mining; the companies obtain better workmen, and the families of its members are lifted to a higher social standing. Of ten graduates, comprising this year's class, four were children of Finnish parentage. Many Finnish miners invest their savings in farm land, working on the farm during summer and fall, and returning to the mines for the winter; continuing thus until they have cleared off all incumbrance from their future homesteads.

The Austro-Hungarian, a man well-built and by nature fitted for hard work, shows different characteristics He is not as ready to become assimilated, his thoughts linger more in the wild Pushtas of his far-off country, and it seems to be his dream to get enough money to go back there to live There are, of course, many exceptions to the rule. Single Austrians will club together and hire one of their country-women to do the house-keeping for them, they buying the provisions for which each one pays his share, and all surplus money thus saved goes into the stocking or bank, for the purpose already indicated. The sanitary conditions under which they thus live are open to much improvement; but they make, in a general way, a good labor stock, which, particularly in dull times, will stand much driving and pushing. An effort is being made of late, at different mining towns, to introduce temperance features into the beneficial societies maintained by the Austro-Hungarians.

Of the third large class of mine workers, the Italians, it is to be said that they are not of such strong physique as the Finlanders or the Austrians, but they are persistent in their work; and, as one mining captain put it, "they do not take such big shovelfuls as the others do, but they pick away, and when the day is over I find that they have done just about as much work." They are, however, better adapted to surface work, and prefer to labor in places where the sun is shining upon them. The man from northern Italy is, according to the statements of mine officials, docile and very willing to work, and in good times, with high wages and plenty of work in sight, they are a better class to get along with than men of other nationalities. The south Italian is certainly frugal and saving, so much so, indeed, that a dozen of them will huddle contentedly together in sleeping quarters which, under ordinary circumstances, would be hardly sufficient for half that number. They believe in the "stocking" savings bank, and their ambition leads them to dream of a banana push-cart in the near future, or ownership of a grape patch in some southern country.

The sturdy Cornishman is considered the mainstay in all mines. He is an experienced, cool-headed miner, reliable, temperate and industrious. Out of this latter class come the greater number of mining captains, foremen and bosses. Other nationalities have too small a representation among the miners to be specially discussed here.

The conditions of mine work on the Missabe Range, as has already been stated, differ in many respects from those of the Vermillion Range, and their effect upon the social conditions of the employed is very observable. On the latter range all mines are underground, and offer a chance for all-year, steady work; which in itself is a great inducement to married men to settle down and become residents of the mining town.

Underground mines continue their operations after closing of lake navigation, the winter's production being deposited on the surface for future shipment. But things are different on the Missabe Range; here we find many open-pit or surface mines. They are worked during the navigation season only, which at best is only seven or eight months, and the men are forced to idleness for the remainder of the year, or have to hunt work in the logging camps on the range. Other mines, which are worked by the milling system, reduce their working force with the advent of winter, and they naturally give preference to the married men. Moreover, taking into consideration the fact that the mines on this range are as yet in a state of development, it is obvious that the inducements for married miners to settle down are not very great; and this, together with outside influences, has created a disposition of unrest and an inclination to shiftlessness among miners; it has brought forth the tramp miner.

The latter is a great source of complaint from mine managers. They say that conditions had become so unbearable to them that they were compelled to adopt strict rules relative to observance of working time and payment of wages. One mine superintendent said:

"The habit of giving to private persons orders on their pay had become such a nuisance that during some months we had to handle over one thousand of such orders, of which a great percentage had been given to saloon-keepers; yet we had only about 400 men on our pay roll.

The Austrian is in the habit of celebrating every holiday on his calendar, and as they did not think it necessary to give us previous notice of their intention, we found on many a morning our working force so crippled that we had to shut down altogether for that day. So in order to protect our own interests, we gave strict notice that none but legal holidays would be recognized."

Another great annoyance is the disposition of single men to quit work at any time, knowing that they again will find ready employment at some other mine or in the lumber camps. The slightest provocation, or the desire to go on a spree, is, as mine officials say, a sufficient inducement in times of plenty of work and good wages to quit a job, and if such men cannot find employment again under their own name they will hire out under an assumed name. All mining concerns have one monthly pay day, and many of them have adopted the rule that anyone who wants to leave their employ has to give ten days' notice, and settlement for back wages will be made only after expiration of such time.

The chances for beneficial recreation and elevating intercourse are but meagre in mining towns, and unmarried men are too much at the mercies of the saloon. Too much money, which otherwise would be saved, is thus expended in society injurious to both health and morals. It must be stated, however, that time will also change this condition; that with the development of the mines on the Missabe Range, chances for all-year work may become better, and that steady, married workmen, will replace the tramp miners.

Noteworthy mine settlements are already established at the Fayal mines near Eveleth at Sparta, and at the Elbe mines, near McKinley. These properties are maintained by the interested mining companies, which also take care of the sanitary regulations. The town of Fayal is a very attractive place; over five hunderd miners' families live in company houses; some of them have bought their homes, paying a small rental for the land, and the surrounding grounds are laid out in gardens or lawns, which help to make the place cheerful, attractive, and home-like. Here, as in all similar places, no stores or saloons are tolerated.

Wages for mine workers have steadily increased during the late years; this will be seen by the following table, which has been secured at different mines of both ranges:

	1896	1897	1898	1899	1900	1901
Miners	$1 83	$1 77	$1 86½	$2 00	$2 20	$2 42
Trammers ..	1 61	1 54	1 81½	1 87½	2 00	2 08
Undergro'nd Laborers ..	1 82	1 70	1 77	1 86½	1 80	2 10
Surface Laborers ..	1 40	1 34	1 48	1 56	1 75	2 10
Contract Workers ..	....	....	....	....	2 35	2 52

The State Bureau of Labor, in its seventh biennial report, gives the following data:

	1899.	1900.
Skilled labor	$2.80	$2.91
Miners	1.93	2.09
Trammers	1.79	2 08
Underground labors	1.74	1.97
Surface labors	1.75	1.98
Contract workers	2.09	2.16
General average	$1.89	$2 07

Mining is classed by insurance companies as a hazardous occupation. The chances for injuries in a mine are manifold, and they come in most instances unforseen, and in spite of all watchfulness and care. A small quantity of falling ore or rock will suffice to crush a person's limbs, and the careless handling of explosives accounts for a number of mine casualties.

The system of contract work, it seems, has also something to do with a great number of fatalities, incidental to mining. The desire to make big wages is an inducement for workmen to take chances, which, under other circumstances, they would not assume. Foremen and officers are ever on the watch, directing the men in their work, and it is an established rule in mines that, first of all things, men must look out for their own safety; but a little too much ore may be taken out of a place before the protecting timbers are put up; men may return to their work, after a blast, before the person in charge has examined the roof over head, and this carelessness may result fatally to the workmen.

The inspection reports for the years 1898, 1899 and 1900, as compiled by the State Bureau of Labor, give the following figures relative to accidents:

	Mines.	Men.	Fatal.	Serious.	Minor acc'dents.
1898	27	4.431	18	39	169
1899	30	6.645	34	71	316
1900	33	7.929	39	41	363

Continued on page 15.

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THE NECESSITY OF USING THE GROUND LOG.

The use of the floating log in thick weather in the vicinity of land, is one of the principal causes of stranding, because the position of the ship by floating log is always so much in error as the current sets during the run. Positions by the floating log require continual correction by astronomical observations, or bearings, which in thick weather are wanting; and as verification of position by soundings requires guiding curves which are not always within reach, nor available, the ship at certain times, has to depend entirely on compass and log.

The error in position by floating log assumes sometimes large proportions. In fog and thick weather vessels are required by international law to go at a moderate speed, assumed to be 6 or 7 miles per hour; and as ocean currents have a velocity up to 2 miles per hour, the error in position reaches one-third the distance run by floating log; and the error in the course made good is up to 1⅝ points, 1-3 being the tangent of 18° 26′=1⅝ points, with the current at right angles to the ship's course. Therefore, on a run of 100 miles, the error in position by compass and floating log is liable to be 33 1-3 miles, an enormous distance for the ship to be out of her way on so short a run. From which it appears, that the International Marine Conference of 1889 in compelling vessels to go at a moderate speed in thick weather, in order to lessen the danger of collision, unwittingly increased the danger of stranding by neglecting to make provision for keeping the error in position, due to the exclusive use of the floating log, within moderate limits.

The defect of the floating log is, that it partakes of the set and drift of current, on account of which, neither the course correction for current, nor the distance made good is found. As a consequence, the former is neglected in practice, and for correct distances, the erroreous distances by floating log are substituted.

An error up to 1⅝ points in the course made good, on account of neglecting the course correction for current, has the same effect as if this error pertained to variation, deviation or leeway; and it is no use to apply these three course corrections without applying the fourth one, because all four corrections form an indivisible whole in converting courses by the ship's compass into courses by chart, and vice versa. All care and painstaking in ascertaining the corrections for variation, deviation, and leeway is in vain, as long as the course correction for current is wanting. By using the floating log, either courses or distances, or both, are in error.

The ground log has no such defects as the floating log. The ground log gives distances made good, and points out the track of the ship over the ground. The angle which the horizontal projection of the ground log-line makes with the fore and aft line of the ship, equals the course correction for leeway and current combined. Any change in current is directly noticeable in a change of the angle referred to, and the heading of the ship is altered accordingly, in order to make good the intended course.

The ground log consists of a heavy weight attached to a line divided into a forerunner and knots, the forerunner to be of sufficient length to admit the weight of touching the ground, before any of the knots run out. The length of knots is 25.3 feet, answering to 15 seconds in time, but the sand glass used is only 14 seconds, one second being allowed for turning the glass and stopping the line. The knots thus logged require a correction for depth of water, which is easily computed in advance and tabulated. The difficulty of handling the ground log increases as the depth of water increases, its use is, therefore, limited to a depth of about 100 fathoms.

With few exceptions, all dangers to navigation are located within the 100 fathom curve from shore, and as the ground log, by diligent training, enables vessels to make good courses within ¼ point, and distances within 1-20 the distance run, positions are not liable to be much in error with a correct point of departure at the 100 fathom curve when making land. Under the foregoing assumption, on a run of 100 miles, the error in position is 5 miles, and for shorter runs proportionately less, which for picking up a guiding curve in thick weather, or a light in clear weather, is near enough to the mark. It may, therefore, be laid down as a rule, that after a run of 100 miles by ground log, verification of position is required, and that courses have to be shaped with regard to it. Within this limit the ground log is a reliable guide over areas where guiding curves are wanting, or are too far out of the way; and for making short cuts in general. For the correct solution of all problems by soundings, the groundlog is indispensable.

It is, however, not in thick weather only that the use of the ground log is a necessity, its use is no less required in clear weather, in ascertaining position by one object bearings, for finding course and distance made good in the interval between bearings forming the baseline of observation.

On account of set and drift of current, by using the floating log, the base line is always in error, as respects distance and direction, and consequently, the distances found from the object are also in error. By the so-called four point fix, frequently recommended to, and used by vessels, the error in position when the object is abeam equals sometimes nearly 1-3 the distance run in the interval between bearings. For instance, the rate of current being 2 miles and the vessel's speed 10 miles per hour the current setting at right angles to the first bearing toward the object, and the distance run in the interval by floating log being 15 miles; then the drift of current during the run equals 3 miles, when the object is abeam; the other two sides of the small triangle of which the drift of 3 miles is the hypotenuse are each 2.1 miles and the distance from the object at the second bearing equals 15—2x2.1=10.8 miles; by counting it 15 miles, as the rule, the error equals 4.2 miles, or nearly 1-3 the distance run. Similar discrepancies are found in all other cases of one object bearings.

The errors in position attendant upon the use of the floating log, and the strandings inevitably resulting therefrom, especially in thick weather and in places where safety curves are wanting; and the reduction of such errors to a minimum, by using the ground log, render the substitution of the ground log, for the floating log, within the 100 fathom curve, a necessity.

JOHN MAURICE.
Civil Engineer and Nautical Expert.
Chicago, December 1901.

STATEMENT OF THE VISIBLE SUPPLY OF GRAIN.

As compiled by George F. Stone, Secretary Chicago Board of Trade, December 14.

CITIES WHERE STORED.	WHEAT. Bushels.	CORN. Bushels.	OATS. Bushels.	RYE. Bushels.	BARLEY Bushels
Buffalo	6,339,000	896 000	780,000	93,000	1,306,000
" afloat	5,242,000	285.000	418,000	.....	357,000
Chicago	6,871.000	5,222,000	1,012,000	1,117,000	101,000
" afloat	163,000	.....	.....	.....	.....
Detroit	921.000	335.000	22.000	181,000	32,000
Duluth	7,865.000	405,000	97 00	420,000	234,000
" afloat	373.000	.....	.....	.....	.....
Fort William, Ont.	1,287.000	.....	.....	.....	.....
Milwaukee	400,000	82.000	126,000	57,000	192 000
Minneapolis	14,211,000	272,000	420,000	93,000	119,000
Montreal	56,000	13.000	177,000	21,000	62,000
Port Arthur, Ont.	63,000	.....	.....	.....	.....
Toledo	421,000	560,000	840,000	271,000	4,000
Toronto	49,000	.....	1,000	.....	67,000
On Canals	133,000	17,000	207,000	37,000	195,000
Grand Total	59 356,000	11,187.000	5,742,000	2,638,000	2,858,000
Corresponding Date, 1900	61,082,000	8,138.000	9,988,000	1,290,000	3 482,000
Increase for week	4,116,000	257,000	.....	115.000	49,000
Decrease " "	.....	.....	674,000	.....	.....

While the stock of grain at lake ports only is here given, the total shows the figures for the entire country except the Pacific Slope.

THE RARE METALS OF THE WORLD.

The Moniteur Industriel Paris, recently contained an article descriptive of the rare metals of the world, of which a part is translated as follows:

"The epithet 'the rare metals' is applied to a class of metals little known to the uninitiated. All are precious, although their use is limited by their price. In the cases of some of them this price is due not so much to their rarity, properly speaking, as to the fact that the process of isolating them, and so obtaining them in their pure state, is costly. In this case the effect becomes the cause; it is often because no serious efforts have been made to utilize them industrially that the process of extracting them has not been improved. Witness aluminum, and more recently thorium and cerium. The last two named were worth about 4,000 francs per kilogram ($392 per pound) before their utilization in gas lighting by incandescence.

"Among other of the rare metals may be cited the following: Vanadium which oxodizes in air with great difficulty, melts at 2,000 degs., and becomes red hot in hydrogen. Neither hydrochloric acid nor nitric acid attack it. The addition of vanadium considerably augments the ductility of copper, aluminum, and iron. These properties would be valuable to electro-metallurgists if the price of the metal were not still very high—6,130 francs per kilogram ($592 per pound). Its use, therefore, is limited to coloring glass and to the preparation of indelible inks by mixture with aniline.

"Uranium, worth 900 francs a kilogram ($86 per pound), is used in the glass and porcelain industries. It has been found that uranium carbide is superior to nickel or tugsten in the manufacture of high-grade steels.

"Tatanium is peculiar in being universally diffused in nature, even the flesh, bones, and muscles of animals containing traces of it.

"Iridium, worth 8,000 francs a kilogram (over $780 per pound), is the hardest metal known, and is used to tip gold pens. This hardness makes it very difficult to coin Siberian gold, which is impregnated therewith, and the Russian mint requires that gold for coinage shall be free from all traces of iridium.

"Palladium, which has the smallest co-efficient of dilatation, is used for the mounting of astronomical instruments. The standard meter of France is made of palladium. The pure metal costs 5,000 francs a kilogram ($482 per pound).

"Selenium, which has the curious property of losing its resistance to the electric current under the influence of light, is used in the telelectroscope, and is worth 220 francs a kilogram ($22 a pound)

"Lithium, worth 12,000 francs a kilogram (over $1,100 a pound) is used only in medicine, its salts being valuable in rheumatic affections.

"Molybdenum, worth 15 francs a kilogram ($1.44 a pound), is used in metallurgy. Molybdenum steel possesses the rare quality of preserving its hardness even when heated to redness.

"Tungsten, worth 8.5 francs a kilogram (80 cents a pound), is also largely used in metallurgy, and gives to steel qualities similar to those imparted by molybdenum."

The directors of the United Steamship Co., of Copenhagen, have resolved to order the building of four new boats of 10,000 tons each for the Copenhagen-Norway-New York route—Thingvalla Line. All the vessels will be built in England, and one is said to be already nearing completion.

Effect of Suction.—The suction caused by a moving vessel, and its latteral effect upon another vessel, depend upon a number of circumstances of which the most important are, the size and speed of the two vessels, and particularly the depth of water beneath them, and the mass and extent of the water on each side; the force being at its maximum and operative for a considerable distance where the water is shallow or confined. The Mesaba, 111 Fed. Rep. (U. S.) 215.

THE BRITISH INSTITUTION OF CIVIL ENGINEERS.

Charles Hawksley delivered his presidential address to the Institution of Civil Engineers last month.

In speaking of ships Mr. Hawksley said—Prior to the commencement of the Nineteenth Century, several centuries had passed during which no radical change had occurred in the size or character of our ships, and, indeed, the great development which has since taken place, had scarcely commenced in 1837.

At the beginning of the Nineteenth Century wind was the only power available for the propulsion of vessels at sea, for although the first boat propelled by steam appears to have been devised by Patrick Miller, assisted by William Symington and James Taylor, and successfully tried on Dalswinton Lake, in Dumfriesshire, in the year 1788, it was not until 1802 that a tug-boat built by Symington, for Lord Dundas, towed two loaded vessels, each of about 70 tons burden, along a reach of the Forth and Clyde Canal. During the succeeding 16 years it was demonstrated by Fulton and Stevens in America, and by Bell and Napier in Great Britain, that steam navigation, both on inland waters and on the ocean, was not only practical from an engineerig, but also from a commercial point of view. In 1819 an American steamship, the Savannah, of 300 tons burden, arrived at Liverpool direct from the United States, having accomplished the passsage in 26 days, partly steaming and partly sailing.

It was, however, not until 1833 that the Atlantic was crossed by a vessel under steam alone, when the Royal William, a steamship built in Canada, crossed from that country to England in 22 days. The first vessel to steam across the Atlantic from the United Kingdom to America, was the Sirius, a vessel of about 700 tons, which, in 1838, made the passage from London to New York in 17 days, being followed three days later by the Great Western, of 2,300 tons gross, which occupied 15 days on the voyage from Bristol to New York. The last-mentioned steamer was designed by the late I. K. Brunel, who also designed the Great Britain, of 3,443 tons gross, which, built in 1845, of iron and furnished with a screw-propeller, crossed the Atlantic in about 12 days.

The change from wind to steam as a means of propulsion, added to the change in the materials of construction from timber to iron, and subsequently to steel, have enabled the dimensions of sea-going vessels to be enormously increased; and, in the case of the mercantile marine, have led to that regularity in the time of transit from port to port, and that economy of working to which we are now so thoroughly accustomed.

The history of naval architecture during the Nineteenth Century has been one of steady progress until we now have the magnificent steamships, sometimes not inappropriately termed "floating palaces," in which the voyages to America, India, Australia, and other distant places are made. These vessels are provided with so many conveniences for the comfort of passengers that it is difficult to imagine anything remaining to be added, for whilst the first-class accommodation is that of a luxurious club, the second and third-class passengers are well provided for; and nearly if not quite, the whole of the "liners" are lighted throughout by electricity, and are furnished with refrigerating apparatus for the preservation of the food required for consumption on the voyage.

The latter part of the century has, however, shown us that the British nation can no longer maintain that practical monopoly of the ocean-carrying trade which she has held for so long a period. Both Germany and America are now in serious competition with us, and the German 'liners" to America surpass all others in regard to size, speed, and luxury of accommodation; and it must be borne in mind that these great vessels not only sail under the German flag and belong to German steamship companies but are also designed, built, and engined in Germany—a fact of grave importance in its bearing on the future of our carrying trade, and of our shipyards and marine engine works .

Wrought iron was first used for shipbuilding about the year 1832, and the first vessel constructed of steel to cross the Atlantic was the Allan liner Buenos Ayrean in the year 1879

The latest innovation in the application of motive power for the propulsion of vessels is the Parsons steam turbine which has recently been successful in attaining very high speeds in the vessels into which they have been introduced, notably in the case of H. M. torpedo boat destroyers Viper and Cobra, in the former of which the great speed of 34.8 knots (equivalent to 40 statute miles per hour) was realized. It is much to be deplored that both these vessels had the misfortune to be lost at sea.

According to Lloyd's register the largest British vessels now afloat are the passenger twin-screw steamer Oceanic of 17,274 tons gross and 6,917 tons net, and the passenger and cargo twin-screw steamer Celtic, of 20,904 tons gross and 13,449 tons net, both vessels belonging to the White Star Line.

The nine largest ships in the Royal navy at the present time have each a displacement of 14,900 tons, and our navy possesses many other battleships not much inferior in size.

In tracing the history of electricity, Mr. Hawksley continued: At the commencement of the Nineteenth Century our knowledge of electricity was practically confined to that of lightning conductors, invented by Benjamin Franklin in 1752, and his various subsequent experiments and observations, and to the pile of battery discovered by Alexander Volta in 1799, following on the work of Galvani begun in 1786. After the invention of this battery the progress of electric science was extremely rapid. By its agency Nicholson and Carlisle in 1800 succeeded in decomposing water. In 1802 Sir Humphrey Davy showed the electric arc in the Royal Institution, and in 1807 laid the foundation of electro-chemical work by decomposing potash and soda.

The first great practical application of electrical science was undoubtedly the telegraph, which was the outcome of many years of persevering effort on the part of inventors and scientific investigators, such as Oersted, Ampere, Sturgeon, Ronalds, Morse, Cooke, and Wheatstone. The first public telegraph line in the world was put down by Cooke and Wheatstone in 1838 on the Great Western Railway between Paddington and West Drayton. When first started the telegraphs of this country were in the hands of various companies, the first being the Electric Telegraph Co., established in 1846, and followed by the Magnetic Telegraph Company. After the companies had with much enterprise carried on the business for twenty years it was acquired by the government, to whom the telegraphs were transferred in 1870. At the present time the length of land lines in Great Britain and Ireland is 33,000 miles, and in the whole world about 770,000 miles.

The first submarine cable was laid between Dover and Calais in 1851 by Crampton, following up the idea worked out by the brothers Brett, and between England and Ireland in 1853 by Mr. (afterwards Sir Charles) Bright, who also laid the first Atlantic cable in 1858. Although it was not until the above mentioned dates that communication with distant parts of the world was achieved, there now proceed from Great Britain and Ireland ten cables to America and twenty-two cables to the Continent of Europe, in addition to which there are ten cables between Great Britain and Ireland. At the end of the last century there were in the world 1,769 submarine cables, having a total length of 189,000 nautical miles. Of these 1,349 cables of 20,000 nautical miles are under various government administrations, and 420 cables of 169,000 nautical miles are owned by companies, nearly all of which are incorporated in this country.

During this period great improvements have been effected in telegraphic apparatus, amongst which may be mentioned the various systems of duplex, diplex, quadruplex and multiplex telegraphy, whereby several messages can be sent over a single wire simultaneously in the same or in opposite directions without interfering one with the other. In the rapid automatic system the working capacity of the line is increased by special automatic transmitting machines. These various improvements have resulted in it being now possible to transmit along a single land wire 600 words per minute, or fifty times the number that could be sent in 1837, whilst in the case of submarine cables 120 words per minute can now be transmitted on a duplex Atlantic line of the present day against five words by means of the cable to America laid in 1858.

Quite recently we have the wonderful system of inductive or wireless telegraphy based on Hertz's experiments on electric waves, following on Clerk Maxwell's theories. Their work, supplemented by that, amongst others, of Branly, Lodge, Marconi, and Sir William Preece, has made the wireless telegraph possible and a practical success. The latest discovery is still in its infancy, and it is not improbable that its progress during the present century may prove to be almost as remarkable as has been that of electric telegraphy by means of wires during the century just closed.

BOOK NOTICE.

Practical Marine Engineering: For Marine Engineers and Students, With Aids for Applicants for Marine Engineers' Licenses. By William F. Durand. Prof. Marine Engineering, Cornell University. Published by Marine Engineering, Inc., New York. Price $5.

The marine engineer of the present day must perfect himself in his profession if he wishes to keep at the top rung of the ladder. To have secured a position and held it for a number of years does not signify that he will have no difficulty in obtaining a new one whenever he so desires. The advances made in practical mechanics during the last decade have been so enormous as to place the old-time engineer far in the rear, unless he has studiously kept abreast of the times and applied himself to the work of thoroughly understanding the newest and most important modern phases of his business. And to do this it has been necessary for him to keep his eye open, to observe and examine closely all new machinery that comes his way, and to read all he can on the subject. There has just been published a book by Prof. Durand on the subject of practical marine engineering which must supply a long felt want, for in its ample pages the marine engineer and the student will find a mine of information that will be of the greatest use to them. The book is made up entirely of matter appertaining to the practical side of marine engineering, and covers every question of importance therein, and must be especially valuable to young engineers who may be studying to apply for steamboat licenses of various grades. To such the value of the book cannot be figured in dollars and cents. There are two main parts, the first treating of marine engineering proper, or the practical side of the subject, and the second to mathematical calculations such as every marine engineer is required to know about, more or less. There are nearly 400 clear and handsomely engraved diagrams and cuts, and every feature of marine engineering is intelligently discussed and illustrated. The materials used in engineering; fuels, types of boilers and engines and auxiliaries; the operation and management of same; valve gears and valve setting; indicator and cards; propulsion, powering and speed trials, as well as electricity, are some of the subjects treated, from which it will be seen that the work is comprehensive and covers the subject most effectively. Prof. Durand writes with a clearness and lucidness, and the examples he has presented are made so simple of understanding that his book will appeal to a very large class of practical men as well as students.

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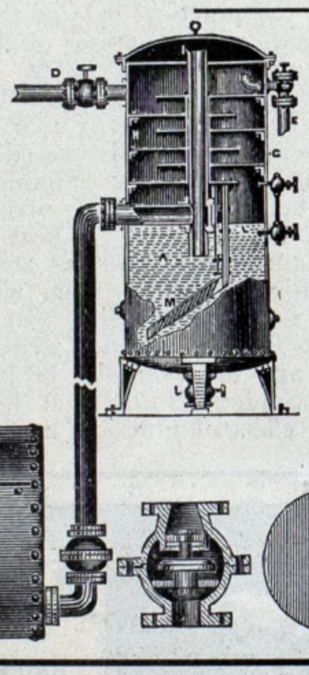

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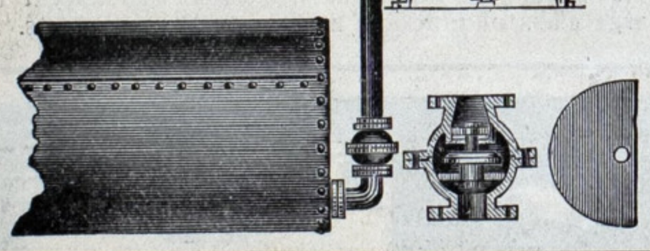

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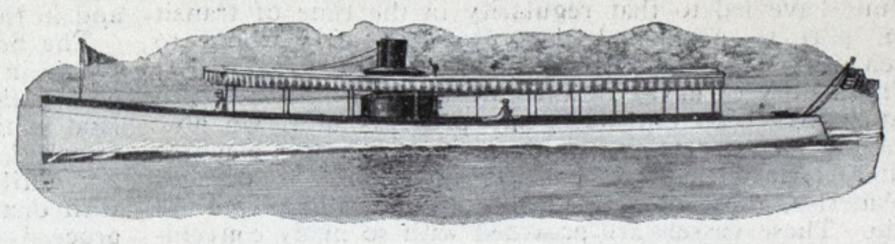

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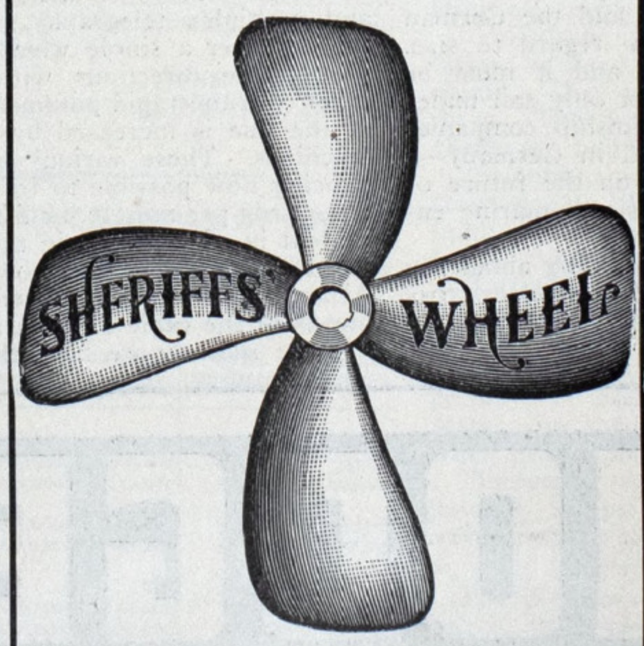

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IRON ORE MINING IN MINNESOTA.

Continued from Page 11.

It should, however, be mentioned that two explosions alone were the cause of fifteen fatal and three serious accidents during last year. The fact, furthermore, that some mining companies report every slight bruise or cut, which may involve a disability to work, of one or two days only, it seems, has to account for such high figures in the accident reports.

All mining companies have arrangements made for medical treatment and care of their men in case of injury or sickness, and as a result of this, spacious and fine hospitals have been built in some mining towns near which a great number of men are employed. Prominent amongst them are the hospital at Ely, the company's hospital at Fayal, and the one recently opened by Dr. More, at Eveleth. The latter is modern in every respect, and has space for forty beds, besides a few rooms for private patients. All mine employes have to submit to the deduction of one dollar per month from their wages, and they receive, as an equivalent, free medical treatment either at the hospital or at their homes, if injured or sick, and the hospital staff will minister also to the miners' families without looking for extra compensation, except in cases of childbirth, etc.

Benefit clubs have been organized in many mines. There is, however, no uniformity in their features, but all have for their object a weekly payment to any member who, by accident, has been disabled, and a sum of money in case of total disability or death as a result of an accident.

The efforts of the Chandler & Oliver iron companies to provide at Ely a place of recreation for their employes should also be mentioned. At beautiful Long Lake, near the Chandler and Pioneer mines, is a strip of land four acres in extent, leased by the Chandler Iron Co., and this tract, which is nicely wooded, has been transformed into a park. Bath houses for both sexes, a grand stand, a pavilion, and other booths, have been built, and the families of the Ely miners here have an opportunitv to while away the hot summer days. The mine managers, who jointly carry all expenses for the maintenance of this park, deserve high credit for this piece of humanitarian work.—Julius Moersch in Journal of Political Economy.

JUDICIAL DECISIONS.

Limitation of Liability.—Loss Through Negligence.—A corporation engaged in the transportation of cargo and passengers between Seattle and Alaskan points maintained a line of steamers to St. Michael, which was the Alaskan headquarters of its fleet, and there transshipped to other steamers and barges, which were run by the company between that port and Dawson and other points on the Yukon river. Its general manager was located at San Francisco, and he sent a superintendent to take charge of all the company's business at St. Michael. Such superintendent being compelled to return, by reason of illness, in July, left in charge his assistant, who was incompetent for the position by reason of his inexperience in such matters, which was known to the general manager, but who was permitted to remain in charge during the remainder of the season. About October 1 he contracted on behalf of the company to take a cargo to Nome, and loaded the same on a river barge, which was wholly unfit for a such a voyage at that season, and which sank in a storm before having started, through the additional negligence of the agent in not having it taken to a safe place Held, that whether such agent in fact had authority to accept such cargo, he had ostensible authority, and the company was bound by his action, and responsible for his negligence and incompetence, and was not entitled to a limitation of liability for the loss under Rev. St., Sections 4283-4285, which were not intended to relieve shipowners from personal liability for their own willful or negligent acts. Parsons et. al., vs. Empire Transp. Co., 111 Fed. Rep. (U. S.) 202.

Submission to Danger in Loading.—A steamer 310 feet long, and having three hatches, entitled under her charter to be furnished with cargo as fast as she can load the same, and where she can safely lie afloat, which is required to lie at a wharf having a frontage of forty feet, only a part of which has a depth of water sufficient to float her while loading, cannot be required to submit to the danger and inconvenience of breasting out at such wharf in order to load without the aid of lighters. McCaldin et al., vs. Cargo of Scrap Iron, 111 Fed. Rep. (U. S.) 411.

Construction of Charter.—A provision of a charter, giving the master authority to control the operations of the vessel in towing barges, and expressly exempting the owner from liability for the abandonment of any tow where, in the judgment of the master, the safety of the vessel required such abandonment, did not confer on the master any powers he would not otherwise have had, nor change the relation of the charterer to the ship as owner pro hac vice, and it gave him no claim on the vessel on account of the wrongful act of the master in abandoning a barge without necessity. The Del Norte, 111 Fed. Rep. (U. S.) 542.

Salvage.—Money Recovered From Body Found at Sea.—Salvage Award.—A fishing schooner on her voyage from Gloucester to the fishing grounds on August 17, 1898, found floating in the water the body of a man who had been a passenger on the Bourgogne, sunk in collision on July 4. Upon the body was found a wallet containing coins and bank notes to the value of $1,050. The body was immediately buried by sinking in the usual manner, and the money was brought back and paid into a court of admiralty. The man's name was not discovered. The salvage involved no danger to vessel or crew. Held, that in view of the probability that the money would not otherwise have been recovered, and of the meritorious action of the officers and crew of bringing it into court, when they might readily have kept and divided it among themselves, one-half the amount would be awarded for the salvage services, to be divided between the owners, master and crew. Gardner et. al., vs. Ninety-nine Gold Coins, et. al., 111 Fed. Rep. (U. S.) 552.

Salvors' Negligence.—Forfeiture of Right to Compensation.—Where tugs have taken a burning ship from her dock, which was on fire, with plenty of room, and, without excuse, beached her in such close proximity to another which has been previously beached that the fire on the water was renewed, after having been practically extinguished, and so as to impede the work around both ships, and delay the final extinguishment of the fire, causing increased damage to the owners to an amount exceeding any reasonable salvage award for their services, they forfeited by their negligence their right to any award. The Bremen, 111 Fed. Rep. (U. S.) 228.

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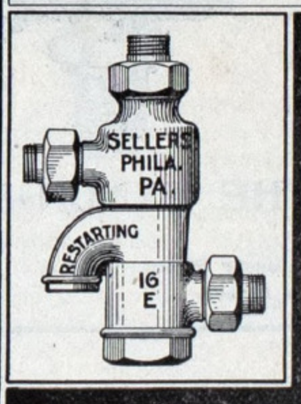

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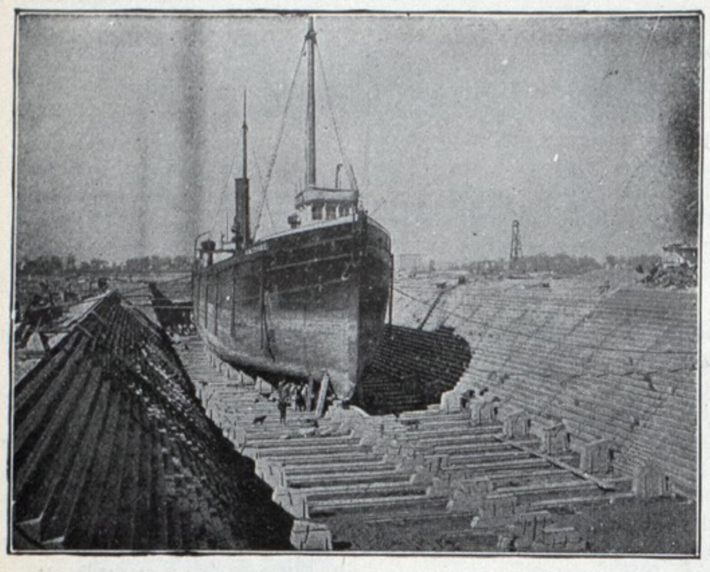

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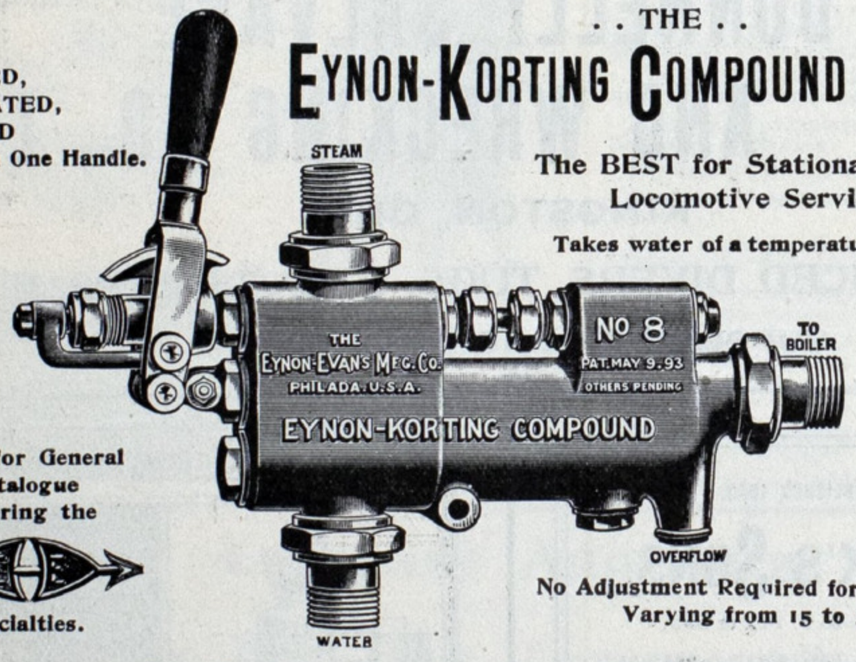

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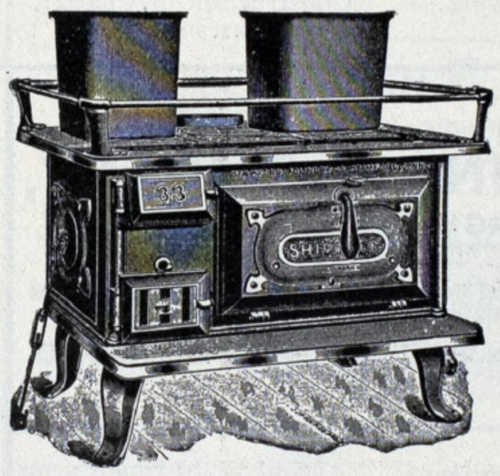

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